THE IRON TRADE REVIEW

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SLOW BUT SURE

IMPROVEMENT DURING PAST EIGHT MONTHS.

Extensive Harbor Improvements—Heavy Business in Wire Products—Railroads Buying Track Fastenings.

August was the best month of the year for the iron business, but the improvement has been very slow, and there is nothing to indicate that it will be more rapid during the remainder of the year. If, however, the same rate of progress can be maintained, conditions will be very satisfactory at the beginning of the new year.

Steel Corporation Activities

The United States Steel Corporation has furnished additional evidence of its intention to continue the making of improvements. The government having refused to improve the harbor at Gary, Ind., the Corporation will do the work itself. A subsidiary company has ordered the four largest ore unloading machines yet designed, to be installed at Ashtabula, O. Each of these machines will have a capacity of unloading 700,000 tons of ore in a vessel season. The Corporation pig iron stocks are now the lowest in its history, being only 70,000 tons, exclusive of the Tennessee company. Corporation activities are now about 60 per cent of normal, measured by blast furnace capacity in operation. Three or four of the blast furnaces at Gary will probably be blown in some time during the fall months, partly in order to get them in running order before the full plant is started, but more specially to provide power, as the works will derive their power largely from gas supplied by the blast furnaces. On the Duluth plant nothing will be done this year, except to perfect the plans. How rapidly construction work on that plant will be pushed next year will depend entirely on trade conditions. The taking of the contract for two bar mills at Gary, by the American Bridge Co., is considered in some quarters as indicating a tendency of the Corporation to manufacture its own equipment. The two Gary mills will be built at the Pencoyd plant, which has a large steel foundry and a machine shop with little work on hand.

Nut and Bolt Meeting

Competition in nuts, bolts and rivets has been very severe this year, and following the meeting of the manufacturers in New York last week, another meeting is being held this week at Niagara Falls, N. Y., at which an effort will be made to take steps to prevent further ruinous competition. The prospect for harmonious action does not, however, seem to be very favorable.

Pig Iron Conditions

Sales of pig iron in the eastern territory and at St. Louis have been in fair volume, but in most parts of the country the market is very quiet. Michigan consumers are inquiring for a considerable tonnage for next year's delivery. Prices show little change.

Structural Material

The contract for the Educational building at Albany has been awarded to the Hay Foundry & Iron Co., and the steel, amounting to about 10,000 tons, will be furnished by the Bethlehem Steel Co. The Jones & Laughlin Steel Co. has taken a contract for 3,000 tons for a building at Los Angeles. There is good demand for reinforcing bars to be used in concrete construction. Receivers of Milliken Bros. have taken several structural contracts of fair size.

Railroad Buying

The Chicago & Northwestern railroad is inquiring for estimates on the main building of its new depot at Chicago, involving about 12,000 tons, and will soon call for bids on accessory buildings involving 30,000 tons. The buying of track fastenings and lights rails at Chicago has been heavy. The Long Island railroad has contracted for 4,600 tons of bridge material. While the order for 55,000 tons of steel rails offered to the mills last February by the Pennsylvania has never been formally cancelled, it is considered as dead. Some of the railroads have a considerable tonnage of rails on hand which will be laid before new orders are placed, and, on the whole, the outlook for the buying of standard sections is not very encouraging. About 3,600 freight cars were purchased during the past week.

Sheets, Pipe and Wire

The demand for sheets has increased in a very gratifying manner, and the principal producer is now operating 67 per cent of its capacity, compared with 61 per cent last week. The demand for merchant pipe has increased. Wire and nail specifications being received by the leading interest are at present heavier than at the time of best business last year.

LARGE ORE UNLOADERS.

The Pittsburg & Conneaut Dock Co., Conneaut, O., has awarded the contract for four ore unloading machines to be erected at Ashtabula. The machines are 15 tons capacity, the largest yet designed, and each will have a capacity of unloading 700,000 tons of ore in a vessel season. They are equipped with weighing hoppers, so that the ore can be weighed when it is loaded into railroad cars.

THE WEEK IN IRON CENTERS

PITTSBURG

Interests Not Dependent on Railroads Doing Good Business.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., Sept. 1.

Local market conditions in the Pittsburg district are peculiar and undoubtedly reflect those of other parts of the country at this time. The greatest contrast is noticed between the activity of those interests not dependent to any large degree upon railroad business and down and out expressions of those manufacturers whose output enters into new construction and maintenance of railroad properties. The steadily increasing volume of business coming to makers of merchant pipe, wire products, and sheets has been highly satisfactory and for the first time since the start of the present depression prompt deliveries are no longer promised. Railroad buying does not enter into any of these branches. The steel and iron bar manufacturers are operating at about 59 per cent of capacity. There is no rail buying, and, although it is now several months beyond the time railroads usually announce their requirements for the coming year, the subject has not been brought up and the only orders placed have been for immediate and pressing needs.

At least one of the big interests has taken the attitude of not pushing its sales on the heavier lines, but is rather stepping aside and "marking time" as one of its officials expressed it; taking what desirable business is offered at scheduled prices with good credits backing the sales but not participating in any scramble.

Pig iron sales are few and far between and the tonnages involved are small. The market is nominal and listless, without tonnage offerings to induce a real test of current quotations. The situation is such that furnace quotations on what little business is going removes the middlemen without direct furnace affiliations.

Pig Iron.—The pig iron market during the past week has been as a general proposition, extremely quiet, with very few sales and the number of inquiries limited. There has not been a sale of sufficient tonnage on any grade of pig iron to establish a new market basis, and $14.50 is still being generally quoted on northern No. 2 at the valleys, although several consumers have received propositions based on fair sized tonnages, provided they accept shipments beginning at once at $14.25 valley. The ruling quotation on southern No. 2 foundry iron is $12.50 to $13, but on account of northern competition and low prices, southern iron cannot compete in this market. The past week has seen one or two deals in basic iron on trade propositions, into which so many considerations enter that it is impossible to quote an equitable price on a valley basis. Bessemer iron is still quoted $15.25 to $15.50 valley, but no sales are reported. We note a 500-ton sale of malleable Bessemer at $14.70 valley. During the past two weeks there have been several inquiries for foundry iron for shipment during the first quarter of next year, and $15.25 valley has been quoted, although, as far as can be learned, nothing has been closed. For third and last quarter shipment on northern iron we quote as follows:

Bessemer, valley	$15.25 to 15.50
Bessemer, Pittsburg	16.15 to 16.40
No. 1 foundry, Pittsburg	15.90 to 16.15
No. 2 foundry, Pittsburg	15.40 to 15.65
Gray forge, Pittsburg	14.65 to 14.90
Basic, valley	14.75 to 15 00
Basic, Pittsburg	15.65 to 15.90

Ferro-Alloys.—The movement in this market is light and confined to small lots. The only sales reported from local agencies were made up of two or three carload lots for shipment further west. Lower prices are prevailing, especially for prompt shipment. For delivery over the remainder of the year $43.50 to $44, seaboard, or $44.45 to $44.95 Pittsburg, is quoted.

Imported 50 per cent ferro-silicon is quoted $69 Pittsburg on forward deliveries; domestic 12 per cent, $29; 11 per cent, $28; 10 per cent, $27. On prompt deliveries these quotations are shaded $1 per ton. The lower grades of imported ferro-silicon are upon about the same basis. These quotations are applicable to Pittsburg territory.

Plates.—Aside from the reported inquiry for several freighters on the lakes, which has not reached Pittslakes, which has not yet reached Pittscome up during the week. The Brooklyn, N. Y., and Springfield, Mass., riveted pipe contracts have not been closed and specifications against orders have been running light, this being particularly true of the heavier lines. The price shading by independent interests has not, as far as can be learned resulted in securing business, as there is practically no inquiry. The latter half of the month just closed was not so good with mills as the first half, but on the aggregate the production averaged about 50 per cent of normal. We quote:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The demand for sheets shows a very decided improvement and is reflected in the increased percentage of mills now in operation by the leading interest. Last week, the American Sheet & Tin Plate Co. was operating 61 per cent of its sheet mill capacity, and during the current week has in operation 67 per cent. Jobbers are ordering freely for stocks, and requesting immediate shipment, indicating that the consumers are pressing for deliveries. Price shading, of which there has been some by the smaller independent interests, ranges from $1 to $2 a ton, but is not general and has not influenced market conditions in any way. We quote.

Black steel sheets, cold rolled, No. 28 gage, $2.50 per 100 pounds, and galvanized sheets, No. 28 gage, $3.55 per 100 pounds, plus the regular extras.

Blue annealed: Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation; and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28.

Jobbers are allowed $1 a ton from these prices.

Tin Plate.—The tin plate business is undergoing the usual seasonable inactivity, and the leading interest is this week operating between 45 and 50 per cent of capacity. There is comparatively little new business and mills are working on specifications against old contracts. We continue to quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—The outlook for new business on standard section rails is not very encouraging, and indications point to a further delay of several months before the leading lines submit their tonnages covering next year's requirements. At present railroads are making no advances whatever to rail manufacturers, and aside from the small tonnages for immediate shipment by the Baltimore & Ohio, Chesapeake & Ohio and the Southern Pacific, nothing new has developed. Rail mills are running very slow with short rolling schedules ahead of them. The leading interest during the past week took on between 1,800 and 1,900 tons of light rails, which is a decided improvement over the week previous. Light rail prices, which have been unsettled and as low as $25 base where rerolling competition was strong, are firmer at the official quotation. On present specifications on Bessemer rails we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $35; 12-pound, $32; 16-pound, $30; 20-pound, $29; 25 to 45-pound, $28; angle splice bars for standard sections, $1.65; standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.80 to $1.90 Pittsburg.

Steel.—The demand for billets, while still light, is better than during the past few weeks on specifications against old contracts. Practically no new business is being placed. There is a better demand for sheet bars because of the increased operations of sheet mills, but the percentage of tin mills shut down more than balances the total, and the business in cut bars is slightly less on specifications than the weekly average for several months.

Bessemer and open-hearth billets, base sizes, are quoted at $25 Pittsburg, and forging billets at $27 Pittsburg, subject to the division of the freight charge over $1 and not exceeding $3, and sheet and tin bars at $27.50 Pittsburg, valley and Wheeling territory, and $27 Pittsburg for delivery to other points.

Hoops, Bands and Cotton Ties.—Only routine specifications are going through in this market, with practically no new business in either department. It is possible that mills will put a short cotton tie schedule through to supplement stocks now in southern warehouses, but latest cotton crop reports indicate that only a small tonnage will be necessary to cover all requirements, as a large allowance for increase was made in the spring. We quote:

Cotton ties, 87c per bundle Pittsburg, plus the freight on lots of 3,000 bundles or more, and 90c per bundle Pittsburg for less than 3,000 bundle lots.

Hoops in carload lots, 1.80c; in less than carload lots, 1.90c; bands, 1.40c, base half extras as per standard steel.

Merchant Bars.—Neither jobbers nor consumers are ordering from the mills for stocks and while specifications are fair, the last two weeks of August were not as good as the first two weeks, although the total for the month showed a great improvement over July. Due to the between season period, agricultural implement manufacturers are not specifying against their contracts, but the general run of trade is keeping up fairly well. The railroad interests are the largest consumers of iron and steel bars, and at the present time are absolutely out of the market. An analysis of the situation leads to the conclusion that aside from railroad business manufacturers of merchant bars are receiving practically a nominal volume of business, enabling their institutions to operate at about 50 per cent. We quote:

Common iron bars, 1.40c Pittsburg in carload lots and over; 1.45c in less than carloads; 1.32c to 1.35c base Pittsburg plus freight to point of shipment on western deliveries; Bessemer steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting 56 per cent in carloads, and 52 per cent less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.60c base. Iron finished tire under 1½ by ½ inch, 1.55c, plus one-half extras on tire card; iron finished tire 1½ by ½ and over, 1.40c, plus one-half extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch thicker, we quote base prices per 100 pounds, $3.35 on hard, and $3.60 on soft.

Structural Material.—From the standpoint of both mills and fabricating concerns, a gratifying feature of the situation is the increasingly large number of inquiries coming into the market for smaller sized structures, investors realizing that at no other time can they secure better prices where small investments are being made. No large building operations are reported, but from all parts of the country tentative propositions for new buildings are being received. The contract for a bridge over the Allegheny river at Oakmont, near Pittsburg, was awarded on Tuesday of this week to the American Bridge Co. The Jones & Laughlin Steel Co. has sold 3,000 tons of material for a public building at Los Angeles, Cal. It will be shipped via the Isthmus of Panama.

Beams and channels, 15-inch and under, 1.60c; over 15 inches, 1.70c; zees, 1.60c; tees, 1.65c; angles from 3 to 6 inches, 1.60c; over 6 inches, 1.70c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Merchant Pipe.—The demand for merchant pipe is good, with a steady increase in the volume of new business and specifications against old contracts. This branch of the business, in common with all other in which railroad purchases are not big factors, is in a very satisfactory condition, and several manufacturers are now getting in a position where they cannot longer promise quick shipment and delivery promises are each week being put farther ahead. During the past week an independent interest sold 10 miles of 10-inch line, and another interest began work on 25 miles of 8-inch that has been under suspension since last year. Another contract, including sizes up to 8-inch for repiping an Ohio city, was also closed and several other deals, some of them for tonnages larger than any here mentioned, are pending. We quote the following official base discounts, with an additional one point and five to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
¼ to 6 inches....	75	65	73	63

Boiler Tubes.—The largest consumers of boiler tubes are buying only for immediate and pressing requirements and the demand, therefore, is not as satisfactory to manufacturers as is the case with merchant pipe. A large percentage of railroad motive power is dead, with no immediate prospects ahead for its utilization and repairs are, therefore, not being made. The demand for commercial trade, aside from railroad purposes, is not active. We quote the following of-

ficial base discounts to the general trade on base sizes:

BOILER TUBES.

	Iron.	Steel.
2¼ to 5 inch.....	52	65

Wire Products.—The feature in this market is the active demand for immediate shipment, the call for commodities including plain and barbed wire, and nails and a fair volume of manufactured fencing. In many instances the manufacturers are extending delivery promises despite the urgent demands of jobbers and dealers in the farming districts for prompt action on orders. Prices are being strictly maintained all along the line. We quote:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2.00; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c.

Wire Rods.—The improvement in the wire trade is naturally reflected in an increased demand for wire rods, although chain makers, who are large buyers of rods, are not particularly active. Prices are being maintained at $33, Pittsburg on Bessemer and $34, Pittsburg on open hearth rods.

Coke.—The coke trade is not active in the general sense of the word, although the number of ovens and total production of the coke regions have gradually increased since the last week in May. The increase is for the most part due to the increasing activities of the Frick Coke Co., whose output is consumed by the Steel Corporation. Spot prices on Standard Connellsville furnace coke have declined, and a good grade can be secured at a range from $1.50 to $1.60 at the ovens and on contract for the remainder of the year, $1.60 to $1.85, ovens, depending upon grade. Standard 72-hour foundry coke on contract is quoted $2 to $2.25 at the ovens, and we note the sale during the past week of 150 cars for shipment through a year at $2.10, ovens.

The Connellsville *Courier* for the week ending August 22, reports 18,242 ovens active, 19,188 ovens inactive with an output of 196,144 tons compared with 18,196 ovens active, 19,188 ovens inactive and a production of 193,144 tons the previous week.

Old Material.—The old material market at present is in the most peculiar position it has been for many years. The current demand and consumption do not justify the present level of prices, but the dealers are so actively buying the small tonnages offered and are so closely holding it in store, that they are practically dominating the market. The accumulations in dealers' yards are very large, one interest alone being reported to have 150,000 tons. The railroads are offering little scrap, their labor forces having been curtailed so that they are not able generally to collect and assort the material along their lines. Some of the large consumers are not affected by the present artificial condition of the market as respects prices, since they have stocks at hand, but generally little material is in mill yards in this district. The Republic Iron & Steel Co. especially was a heavy buyer during the recent low prices, and is now in a favorable position as to its scrap requirements. We continue to quote as follows, gross tons, delivered in the Pittsburg district:

Heavy melting scrap, $14.50 to $15.00; re-rolling rails, $16.00 to $17.00; bundled sheet scrap, $12.00 to $12.50; iron axles, $20.50 to $21.00; old iron rails, $17.00 to $18.00; No. 1 wrought scrap, $15.50 to $16.00; old car wheels, $14.50 to $15.00; low phosphorus, $18.00 to $18.50; machine shop turnings, $9.25 to $9.75; cast borings, $8.50 to $9.00; No. 1 cast scrap, $14.00 to $14.50; malleable, $14.00.

CHICAGO.

Conditions of Depression Slowly but Surely Disappearing.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Sept. 1.

Manufacturers of all kinds of iron and steel unite in the opinion that August proved the best month in the way of new tonnage and specifications since the panic of last fall. Everyone is guardedly optimistic as to the future, but all are of one mind in that the tide of depression appears to have permanently turned. In wire and nails, the leading interest is receiving specifications at the rate of 1,000 tons a day, which is considerably in excess of the volume of business in the palmy days of 1907. In a modified degree, this condition is true also of steel bars and agricultural shapes, and all the mills in the west manufacturing these products are operating to their full capacity. The demand for bar iron, sheets, pipe and tubes is also steadily improving and that low stocks of these materials are held by jobbers and consumers is borne out by the frequency with which immediate shipment is specified. Track supplies are again being ordered in lots of 1,000 and 2,000 kegs, something that has not been experienced in the last eighteen months. With the settlement of the price question, $2 a ton below the previous schedule, orders for light rails are more numerous and of larger tonnage than formerly, and more orders for this product were taken in the month just closed than for the entire three months preceding. Heavy gages of sheets and light plates are suffering from price cutting, the shading ranging from $1 to $2 a ton on both products. Structural steel remains quiet, the only feature of the week being the fact that the Chicago & North Western Railway has issued the plans and is asking figures on the main building of its new depot, for which 12,000 tons of steel will be required. Demand for standard rails is light, the aggregate sales this week not exceeding 2,000 tons. No change is noted in scrap or pig iron.

Pig Iron.—The developments in the past week have been of little importance. No price changes have occurred, but a stiffening of the southern schedule on the basis of $13.00 Birmingham for No. 2 foundry is apparent, and one or two small sales have been made at this figure. It is still possible, however, to get iron at $12.50, and there is very little likelihood that this price will be withdrawn while local furnaces remain in their present unsettled condition. Northern irons are suffering from an over-production, and the nominal quotation of $17 Chicago for No. 2 is not rigidly adhered to. Valley irons are getting into this market at $16.90 Chicago, for No. 2, which means $14.50 furnace, and the local stacks are compelled to meet this competition. The large stocks of iron reported in the valley and Hanging Rock districts are a heavy drag on this market, and these will have to be moved before any material change can take place in Chicago quotations. Some inquiry has appeared this past week for 1909 deliveries, and southern furnaces have bid $13 Birmingham on same, while valley furnaces have offered to take the orders on the basis of $14.75 furnace. No deals were transacted, as the prospective purchasers wanted to negotiate on the basis of $12 Birmingham for No. 2. Shipments on contracts are going forward in the usual routine, and the melt of iron is unquestionably increasing. This fact is further borne out by the improved demand for small lots for immediate delivery. Our prices of last week are unchanged, as follows:

Lake Superior Charcoal.....	$19.50 to 20.00
Northern Foundry No. 1.....	17.50 to 18.00
Northern Foundry No. 2.....	17.00 to 17.50
Northern Foundry No. 3.....	16.50 to 17.00
Southern Foundry No. 1.....	17.35 to 17.85
Southern Foundry No. 2.....	16.85 to 17.35
Southern Foundry No. 3.....	16.35 to 16.85
Southern Foundry No. 4.....	15.85 to 16.35
Southern No. 1 Soft.....	17.35 to 17.85
Southern No. 2 Soft.....	16.85 to 17.35
Southern Gray Forge	15.60 to 16.10
Southern Mottled	15.35 to 15.60
Southern Silveries, 4 per cent Silicon	18.85 to 19.35
Southern Silveries, 5 per cent Silicon	19.35 to 19.85
Southern Silveries, 6 per cent Silicon	19.85 to 20.35
Jackson Co. Silveries, 6 per cent	19.90 to 20.40
Jackson Co. Silveries, 8 per cent	20.90 to 21.40
Jackson Co. Silveries, 10 per cent	21.90 to 22.40
Malleable Bessemer	17.25 to 17.75
Standard Bessemer	18.25 to 18.75
Alabama Basic	16.85 to 17.35

Billets and Rods.—Very little merchant business is coming into the market, aside from specifications on contracts already in force. The railroads and car builders, as might be evidenced from the fact that nearly 3,600 cars have been

purchased in the past week, are taking more billet steel than any other line of business, and but for these orders the market would be extremely dull. Prices are holding up well, being $26.50 for 4 x 4 inch rolling billets; and $28.50 base for forging billets, Chicago deliveries. Bessemer wire rods are $33; open hearth, $35, and chain rods $33, all f. o. b. Pittsburg.

Merchant Bars.—The condition of trade in all classes of bars is exceedingly gratifying. All the mills in this section able to operate are in full blast, and the volume of specifications justifies the belief that the turn is permanent. An especially surprising feature of the market is the quantity of small orders coming in. They come from all branches of the consuming trade, and invariably quick shipment is specified. Active demand for reinforcing bars is one feature of this buying, indicating a sharp resumption in the building trade. The Steel Corporation will shortly require a large tonnage of this material for the new pier which it proposes to build at Gary. This will be over a mile long, and it is said will be built of concrete, with steel piling foundations. Agricultural shapes, however, continue in the greatest demand; and from a tonnage standpoint bar iron for railroads and car works is next in line. We quote Chicago delivery, as follows:

Bar iron, 1.50c to 1.53c; soft steel bars and bands, 1.58c, half extras; soft steel angles, less than 3 x 3, 1.68c; hoops, 1.98c base, full extras; planished or smooth finished tire steel, 1.78c; iron finish, up to 1½ x ½-inch 1.73c base tire card; iron finish, 1½ x ½-inch and larger, 1.58c base steel card; channel for solid rubber tire, ¾ to 1-inch, 2.08c, and 1⅛-inch and larger, 1.98c; smooth finished machinery steel, 1.83c; flat sleigh shoe, 1.63c; concave and convex sleigh shoe, 1.83c; cutter shoe, 2.05c; toe calk steel, 2.13c; railway spring, 1.93c base steel card; vehicle spring steel, 1.98c base, vehicle card; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 56 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.90c to 2c, full extras; soft steel bars, 1.80c per 100 pounds base, plus half extras; soft steel hoops, 2.30c, full extras.

Plates.—Except for an improved demand on local jobbers, there is no change to note in the local plate market. Pick-up orders are brisk, which besides denoting a betterment in fabricating channels, indicates that stocks in consumers' hands are low. Mill prices are irregular, the cutting on narrow widths and light gages by independent mills ranging from $1 to $2 a ton. With this reservation, we quote official prices as follows:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.78c Chicago. For extras see Pittsburg report. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 2c to 2.10c; from 72 to 96 inches wide, 2.10c to 2.20c; 3/16-inch up to and including 60 inches wide, 2.10c to 2.15c; 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.10c to 2.15c. Flange and head quality, 25c extra.

Sheets.—The improvement in the stamping trade and the general demand through hardware channels have given the sheet market a healthy appearance. Orders are also being received in greater volume from metal workers in the building trades, indicating a revival in this line of business. Heavy gages continue in the lightest demand. We quote store prices, Chicago delivery, below. For mill prices, see Pittsburg report.

No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c. Galvanized sheets, No. 10 to 16, 3.05c to 3.10c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4.00c; No. 30, 4.40c to 4.50c.

Structural Steel.—Figures have been asked by the Chicago & North Western Railway on the 12,000 tons of steel required in the new depot building. This is the only large specification that has come out during the week. The only important order let was for a 900-ton bridge for the Midland Valley R. R. Co., Muskogee, Okla., which went to the Pennsylvania Steel Co. The American Bridge Co. received only one order of over 100 tons last week from its entire western division. This was for 208 tons for a power house for the Consolidated Light & Power Co., Deadwood, S. D. The remainder of the orders ranged downward from 90 tons to one and two-ton lots. The plans for the approaches, train sheds and accessory buildings for the new Northwestern depot are expected to be issued in a couple of weeks. It is estimated the steel required will exceed 30,000 tons. Negotiations are also in progress for the financing of the new bridge across the Mississippi river at St. Louis for the McKinley traction system in Illinois. The amount of steel required in this structure will be 5,000 tons, but it is not expected the steel contract will be let for some months, although work on the piers is in progress. Mill orders for structural steel continue very light, the only encouraging feature in the situation being the large number of freight and passenger cars under negotiation. Nearly 3,600 were purchased last week, and further contracts are expected shortly. We quote as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.78c to 1.81c delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $1.95 per 100 pounds; angles over 6 inches, $2.05 per 100 pounds, base; beams, 3 to 15 inches inclusive, $1.95 per 100 pounds, base; channels, 3 inches and larger, $1.95 per 100 pounds, base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—Track supplies and light rails are moving very smartly, the volume of orders for these products received by the Illinois Steel Co. during August exceeding the tonnage of any previous month for a year past. One order for spikes was for 2,000 kegs, another for 1,000 kegs and several for 500 kegs and smaller lots. The Joliet plant, where this material is manufactured, is behind in its shipments for the first time in 18 months. The price of light rails has been reduced $2 a ton, and at $26 with the usual extras, the market now is firm. There is no development of importance in standard sections. About 2,000 tons were sold last week by the local mill, and 220 tons of high girder rails were disposed of by the Pennsylvania Steel Co. Specifications for standard sections are not coming in very actively, and it is expected that about 200,000 tons of undelivered business will be carried over into 1909 by the local rail mill. This is a larger tonnage than for many years past. We quote as follows:

Standard rails, $28 f. o. b. mill, full freight to destination; light rails, 25-pound to 45-pound, $26; 20-pound, $27; 16-pound, $28; 12-pound, $29. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.10c to 2.20c; with hexagon nuts, 2.25c to 2.35c. Small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

Cast Iron Pipe.—The week's business is up to the average, although the total tonnage in the main is made up of small orders. An interesting feature of the business is the number of orders from private enterprises, indicat-

ing a loosening of the money market. Prices are without change, and we quote 4 to 6-inch pipe, $27; 6 to 12-inch pipe, $26; larger sizes, $25; gas pipe, $1 a ton higher.

Merchant Pipe and Boiler Tubes.—In figuring the month's sales, it is observed that shipments during August exceed those of any other month this year. This is about all that can be said in the way of news. We quote mill discounts, Chicago delivery, carload lots, as follows. On steel pipe jobbers are allowed a concession of one point and 5 per cent additional from the schedule in force.

	—Steel—	
	Black.	Galv.
¼ to 6 inches, inclusive.....	73.2	63.2
7 to 12 inches, inclusive.....	70.2	55.2

BOILER TUBES.			Seam-
	Steel.	Iron.	less.
2¼ to 5 in., inclusive....	63.2	50.2	50.2

MERCHANT PIPE.

	—Steel—	
	Black.	Galv.
⅛ to ¼ inch.....	65	49
⅜ inch	67	53
½ inch	69	57
¾ to 6 inches.....	73	63
7 to 12 inches.....	69	54

Wire Products.—The demand for wire nails, horseshoes and barb wire was never better this year. Specifications on the leading interest are averaging 1,000 tons a day, a tonnage considerably in excess of the business in August, 1907. This is not the barb wire season, nevertheless jobbers are specifying with a freedom that denotes low stocks and active demand. Orders from the manufacturing trade for smooth wire also show a steady increase. Prices were reaffirmed at the meeting of sales agents in Cleveland last week. We quote as follows:

Wire nails, $2.13; painted barb wire, $2.28; galvanized barb wire, $2.58; smooth annealed wire, $1.98; smooth galvanized wire, $2.28; polished staples, $2.23; galvanized staples, $2.53. Carload lots to retailers, 5 cents higher; less than carload lots, 15 cents higher.

Coke.—Inquiry for furnace coke for next year's delivery is active and some good sized orders are being closed. The local prices for this delivery range from $1.90 to $2.00 at the ovens. For 1908 shipment, the market is $1.60 to $1.85 ovens. There is no change in the foundry situation, and demand for coke from this trade is of a sporadic nature. Prices are firm at $2 to $2.25 ovens for any shipment.

Old Material.—There have been few changes in the scrap market this week. Prices are uniformly firm, but are considered too high by melters to invite much tonnage. Consequently, actual trading has been light. The Chicago & Northwestern railway has out a new list of 1,500 tons. We quote gross tons in the first paragraph as follows:

Old car wheels	$16.00 to 16.50
Old iron rails	16.75 to 17.25
Re-rolling rails (4 ft. and over)	16.00 to 16.50
Old steel rails (4 ft. and under)	14.50 to 15.00
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	14.25 to 14.75
Heavy melting steel	13.25 to 13.75

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.25 to 13.75
No. 2 R. R. wrought	12.25 to 12.75
Knuckles, couplers and springs	13.00 to 13.50
Shafting	16.00 to 16.50
Iron car axles	19.00 to 19.50
Steel car axles	17.25 to 17.75
Dealers' forge No. 1	10.50 to 11.00
Pipes and flues	10.00 to 10.50
No. 1 cast, 150 lbs. and less	13.25 to 13.75
No. 1 mill	7.50 to 8.00
Mixed busheling (Nos. 1 and 2)	8.00 to 8.50
Country sheet	4.00 to 4.50
No. 1 boiler cut	9.50 to 10.00
Boiler punchings	11.50 to 12.00
Cast borings	5.25 to 5.75
Mixed borings, etc	5.25 to 5.75
Machine shop turnings	6.50 to 7.00
Railroad malleable	12.50 to 13.00
Agricultural malleable	11.75 to 12.25
Stove plate and light cast scrap	12.00 to 12.50
Old iron splice bars	16.00 to 16.50

CLEVELAND.

Billets Sold at Low Price—Bolt and Nut Makers' Meeting.

Office of THE IRON TRADE REVIEW,
Browning Building, Sept. 1.

Iron Ore.—Shipments of ore continue about the same as they have been for a number of weeks. Furnace interests are still unable to estimate their probable requirements, and sales are few and for small amounts.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—Sales in the immediate Cleveland district have been very moderate, but Cleveland agencies having furnaces in Buffalo and Toledo report very fair business, and we note sales of 2,000, 1,000 and 900 tons and a number of inquiries pending. In the Buffalo district, melters have been requested to notify the sellers as to when deliveries will be required, as furnaces have made sales equal to the probable production for the remainder of the year. At Toledo, $15.25 for this year's delivery and $15.50 for the first quarter of 1909 are being quoted for No. 2 foundry. We quote, f. o. b. Cleveland, as follows:

Bessemer	$16.55 to 16.65
No. 1 foundry	15.40 to 15.80
No. 2 foundry	15.25 to 15.65
No. 3 foundry	14.90 to 15.25
No. 2 southern	15.85 to 16.10
Gray forge	14.00 to 14.50
Lake Superior charcoal	19.50 to 20.00

Coke.—The market is lifeless. On contracts we quote furnace coke at $1.60 to $1.80 and foundry coke at $2 to $2.25.

Finished Material.—The sale of a fair tonnage of billets in the Cleveland market at $3 below the regular prices has caused some commotion.

Bolt and nut manufacturers, who have been actively competing for many months until some very low prices have been named, held a meeting in New York last week in an effort to prevent further ruinous competition, and another meeting is to be held at Niagara Falls this week for the same purpose, but the present outlook is not very favorable for anything very definite being done.

Mill agencies report a fair volume of business covering a wide range of products, and part of the contract for the reinforcing bars for the new state hospital for the criminal insane at Lima has been awarded to the Carnegie Steel Co. Jobbers report that while August was the best month of the year, improvement has been exceedingly slow and irregular, some days showing a very fair amount of business, while on other days almost nothing is done.

Old Material.—A tendency toward softening of the market has been observed yet there is a latent strength shown that does not permit of any change in quotations over those of last week. Local dealers are continuing to hold tightly to their stocks, and in fact, Cleveland jobbers are compelled to go outside of the city for stock in any quantity. This situation has been true for the past several months. While local mills are operating, yet they have not been buying of late in quantity, having stocked up several weeks previous to resuming. We continue to quote, f. o. b. Cleveland, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (re-rolling)	15.00 to 15.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old car wheels	15.00 to 15.50
Old steel boiler plate	12.50 to 13.00
Steel axles	18.00 to 18.50
Malleable iron (railroad)	13.00 to 13.50
Malleable iron (agricultural)	11.50 to 12.00
Heavy steel	13.75 to 14.25
Country mixed steel	12.00 to 12.50
Low phosphorus	16.00 to 16.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.00 to 13.50
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	12.00 to 13.00
Iron axles	17.00 to 18.00
Axle turnings	9.50 to 10.00
Machine shop turnings	7.50 to 8.00
Grate bars	11.00 to 11.50
Pipes and flues	11.00 to 11.50
Tank iron	11.00 to 11.50
Hoop and band iron	8.00 to 8.50
Sheet iron	6.00 to 6.50
Wrought drillings	7.50 to 8.00
Stove plate	11.00 to 11.50
Cast borings	7.00 to 7.50

NEW YORK.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St, Sept. 1.

Pig Iron.—It is estimated that during the past week sales in the eastern district, comprising the Philadelphia and New York territories and New England, aggregated 50,000 tons, practically all of which was for delivery running through the remainder of the year. A considerable part of this tonnage was basic taken by eastern Pennsylvania plants, although pipe manufacturers were heavy purchasers. New England melters took on a number of lots, but no very large tonnages were included. The net result of the brisk selling movement which characterized the last three weeks of August has been to reduce the number of weak spots in the eastern market to a minimum. Occasionally a furnace is still making low quotations, but on the other hand certain producers are now asking $16.50 at the furnace, and are refusing business at lower figures. The average of the market is higher than two weeks ago, and the situation is certainly more firm. The latest figures available show that stocks in eastern furnace yards are down to about 80,000 tons and rapidly decreasing, while orders on the books of these interests are for about three and one-half times that tonnage, having made a gain of 50,000 tons in a month's time. With the beginning of the grain movement, notice has come of a sharp advance in canal freight rates, which means that the water shipment of Buffalo iron to points along the Hudson river and the Sound is practically over. Melters are commencing to bid for iron and the situation is resolving itself more and more into a seller's market. We quote, tidewater delivery spot and last quarter, as follows.

Northern foundry No. 1	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	15.50 to 15 75
No. 2 southern foundry	16.75 to 17.25
Malleable	17.50 to 18.00
Basic	15.00 to 15 50
Gray forge	15.25 to 15.75

Ferro-Alloys.—The 1,500-ton ferro-manganese inquiry for a western consumer is understood to be still in the market, and two or three other inquiries aggregating about 600 tons are current. Selling, however, is light and the market level is unchanged at $44 to $45.50, seaboard, the latter figure being for 1909 delivery. Ferro-silicon is quiet at $68 to $70, Pittsburg. A good general trade is reported in ground ferro-manganese.

Finished Materials.—The event of chief interest in the eastern market during the week has been the announcement that the steel for the Educational building at Albany, requiring close to 10,000 tons, will be fabricated by the Hay Foundry & Iron Works, and that the steel will be furnished by the Bethlehem Steel Co. This contract has been pending for a considerable time, and has been reported as going to other interests. The 4,600 tons of bridge materials for the Glendale and Montauk cut-offs of the Long Island railroad has been placed with American Bridge Co. The receivers of Milliken Bros. have secured the contract for the steel work of the Boston warehouse for the American Sugar Refining Co., 1,000 tons, and for a 400-ton building at Princeton University. Bookings of the leading interest for August amounted to 18,000 tons.

Railroad inquiry continues to show improvement, particularly in nuts, bolts and other supplies needed for immediate repairs. Bids go in late this week on 11 bridges for New York Central grade crossing elimination work at Buffalo, aggregating 2,000 tons. The Erie is in the market for 5,000 pairs of angle bars and 1,000 kegs of spikes. The New Haven has bought 800 tons of heavy sections for its street railway operations and is in the market for 800 tons additional for this purpose, and for 4,000 tons of standard sections; the Pennsylvania Steel Co. took the business already placed. No decision has been announced on the Clinchfield project, involving 6,000 tons of bridge materials. The award on the Harriman steel car inquiry is held up until the return of Mr. Harriman to the city.

In cast iron pipe, the 1,800 tons for Brooklyn, bids on which were opened a week ago, will be furnished by M. J. Drummond & Co., the price being $22.20, delivered. This is chiefly 8-inch pipe. The McWane Pipe Co. has received the contract for a cast iron lighthouse for Delaware Bay, weighing about 160 tons. Both cast iron and steel pipe makers are figuring on the Springfield, Mass., job, bids on which close next week. The Amityville extension is still held up by litigation over the bid on lock-bar pipe. Gardiner, Mass., is taking bids today on a small lot of cast iron pipe.

Bar iron mills are asking somewhat higher prices, but are taking on very little business. It develops that a meeting was recently held at Philadelphia with the idea of reviving the eastern association, but several important factors in the trade were not represented and little progress was made. In other lines there is little change. We quote: Angles, 3 to 6 inches x ¼-inch and heavier, 1.76c; beams, 3 to 15 inches, 1.76c; tees, 3 x ¼-inch and heavier, 1.81c; plates, carloads, tanks, 1.76c; marine boilers, 2.16c; bar iron, 1.46c; soft steel bars, 1.56c; sheets, No. 28, black, 2.66c.

Old Materials.—Except in heavy melting steel, of which a number of 1,000-ton lots have recently changed hands, current trading in this district has been confined to small lots, chiefly of rolling mill material. Mills are buying more liberally, but the impression prevails that this is more commonly an effort to discount the future than to care for immediate or early needs. Borings are slightly higher. We quote gross tons, New York delivery, as follows:

Old iron rails	$15.00 to 15.50
Old steel rails, re-rolling	14.00 to 14.50
Relaying rails	20.00 to 21.00
Old car wheels	12.50 to 13.00
Old iron car axles	17.50 to 18.00
Old steel car axles	16.50 to 17.00
Heavy melting steel	12.00 to 12.50
No. 1 railroad wrought	15.00 to 15.50
Iron track scrap	12.50 to 13.00
Wrought pipe	10.50 to 11.00
Cast borings	7.00 to 7.50
Wrought turnings	8.50 to 9.00
Heavy cast scrap	12.50 to 13.00
Railroad malleable	10.00 to 10.50
Stove plate	10.50 to 11.00
Grate bars	10.00 to 10.50

CINCINNATI.

Number of Small Orders For Pig Iron Has Slightly Increased.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Sept. 1.

Pig Iron.—The volume of small orders has been slightly larger during the past week than in the one preceding, but the aggregate tonnage in this territory is not large. Prices remain stationary and southern iron is well maintained at $12.50 Birmingham with some furnaces asking $13. One of the larger producers has arranged to blow in an additional stack and is soliciting business at $12.50, while a week ago its schedule was $13. The inquiry is mainly composed of smaller tonnages ranging from 200 to 500 tons, but we note that some Michigan melters are inquiring again for prices for next year's delivery, and one of these inquiries involves 5,000 tons divided between northern and southern iron. There is an inquiry of 1,000 tons of analysis iron for last quarter delivery. Two inquiries for Bessemer of 1,000 tons each, one for prompt shipment and one for last quarter, are pending. Considerable interest has been shown in the placing of an order for about 2,000 tons of malleable in Indiana for next year's delivery. It is understood that a special price was made on this iron in consideration of the melter taking in iron on old high priced

contracts; and the order was divided between three furnaces. Northern iron is quotable at $15 Ironton. The new Miami furnace at Hamilton, O., which went into blast about a week ago, is reported to be working satisfactorily. The market seems to have no defined tone excepting that southern iron is firm and northern iron is barely steady with constant intimations of slight concessions, although sales are reported at $15 Ironton furnace for fairly representative quantities. Unofficial reports of a near settlement of the Birmingham coal strike have been received and are regarded as likely to have a tendency to increase production of southern iron, and may have an influence on prices by reducing cost of coke and thus reducing cost of production. We quote for prompt shipment and balance of the third quarter, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, as follows:

Southern foundry No. 1	$16.25 to 16.75
Southern foundry No. 2	15.75 to 16.25
Southern foundry No. 3	15.25 to 15.75
Southern foundry No. 4	14.75 to 15.25
Southern No. 1 soft	16.25 to 16.75
Southern No. 2 soft	15.75 to 16.25
Southern gray forge	14.25 to 14.50
Northern No. 1 foundry	16.70 to 17.20
Northern No. 2 foundry	16.20 to 16.70
Northern No. 3 foundry	15.70 to 16.20
Northern 8 per cent silicon	19.70

Finished Material.—Specifications on contracts have been better during August than for some months, but new business is moderate. The jobbing demand is only fair, as mills are in position to make prompt shipments. Small orders are filled here at the following prices:

Iron and steel bars, 1.85c to 2c, full extras. Angles, 3 x 3 and over, 2.10c to 2.25c; beams and channels, 15 inches and under, 2.10c to 2.25c; small angles and architectural channels, 2c base; plates, ¼-inch and heavier, 2c; 3/16 inch, 2.10c; No. 8, 2.15c; sheets, blue annealed, No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; box annealed sheets, Nos. 18 and 20, 2.55c to 2.65c; Nos. 22 and 24, 2.65c to 2.75c; Nos. 25 and 26, 2.70c to 2.80c; No. 27, 2.75c to 2.85c; and No. 28, 2.85c to 2.95c; boiler tubes, 2¼c to 5 inches, 62 per cent off base; turnbuckles, 45 per cent off, rivets, 3c base; cold rolled shafting, 47 to 50 per cent off list; steel tire, 2.05c to 2.10c base.

Coke.—The market is unchanged and foundry coke for prompt shipment is easy in some districts with rather free offerings. Calls for coke on contracts are moderate and show no change. There is but little inquiry for forward delivery. Prices in the leading coke producing districts are as follows:

	PER TON.
Wise county furnace coke	$1.90 to 2.00
Wise county foundry coke	2.10 to 2.25
Pocahontas furnace coke	1.60 to 1.75
Pocahontas foundry coke	2.00 to 2.25
Standard Connellsville furnace coke	1.75 to 1.80
Standard Connellsville foundry coke	2.00 to 2.25
Connellsville district furnace coke	1.60 to 1.65
Connellsville district foundry coke	2.00 to 2.25

Old Material.—The situation continues largely a dealer's market with only a moderate demand from melters. Dealers are firm in their views and while they are carrying liberal stock, continue to maintain prices. Dealers' prices to consumers are as follows:

Old No. 1 R. R. wrought, net tons	$11.50 to 12.50
Cast machine and fdy., net tons	12.00 to 12.50
Old iron rails, gross tons	14.00 to 14.50
Old steel rails (re-rolling) gross tons	13.25 to 13.75
Old short lengths, gross tons	12.50 to 13.00
Old iron axles, net tons	16.00 to 16.50
Heavy melting scrap, gross tons	12.50 to 13.00
Stove plate, net tons	10.00 to 10.50
Wrought turnings	5.50 to 6.50
Cast borings, net tons	4.50 to 5.00
Car wheels, gross tons	13.50 to 14.50

PHILADELPHIA.

Office of THE IRON TRADE REVIEW,
408 Central Trust Bldg., Sept. 1.

Pig Iron.—Prices are stiffening. Little gray forge is to be had at any price. Southern has about reached $13 Birmingham. Virginia is selling at $14 to $14.50. Both buyers' and sellers' stocks are low, probably the lowest that they have been this year. And at the same time the volume of orders on the furnace books is steadily increasing and little, save the unsatisfactory prices prevailing, prevents the blowing in of new stacks. While the run of orders is much the same as it has been for the past month or six weeks, so far as their individual size is concerned, the stream of them constantly swells and brings with it encouragement and a feeling that better things are coming. The month of August was the best of the year so far and was more consistently good than any other month, the end being more satisfactory than the beginning. For eastern Pennsylvania and surrounding territory we quote as follows delivered in buyer's yard:

No. 1X foundry	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	16.00 to 16.50
Standard gray forge	15.25 to 15.50
Basic	15.25 to 15.50
Low phosphorus	21.00 to 21.50
No. 2 Birmingham	17.00 to 17.50
No. 2 Virginia	16.85 to 17.35

Finished Material.—The market is comparatively quiet. One of the local steel companies has purchased during the past week 4,000 tons of No. 1 steel scrap for billets. We quote as follows delivered in this territory: Structural, 1.75c to 1.90c; plates, 1.75c to 1.80c; refined iron bars, 1.40c to 1.45c; steel bars, 1.55c.

Old Material.—The scrap market has taken another quite general advance under a somewhat active demand during the past week and we quote as follows:

Old steel rails (re-rolling)	$16.50 to 17.00
No. 1 steel scrap	15.25 to 15.75
Old steel axles	21.00 to 22.00
Old iron axles	22.50 to 23.50
Old iron rails	20.00 to 20.50
Old car wheels	14.50 to 15.00
Choice scrap R. R. No. 1 wrought	18.00 to 18.50
No. 1 yard scrap	16.00 to 17.00
Machinery scrap	15.00 to 15.50
Low phosphorus scrap	19.00 to 19.50
Wrought iron pipe	14.00 to 14.50
No. 1 forge fire scrap	12.00 to 12.50
No. 2 forge fire scrap, ordinary	9.00 to 10.00
Wrought turnings	11.50 to 12.00
Axle turnings, heavy	12.00 to 12.50
Cast borings	10.50 to 11.00
Stove plates	13.00 to 13.50

BUFFALO.

Demand for Pig Iron Shows Some Improvement.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Sept. 1.

Pig Iron.—The largest sales reported this week were for Buffalo delivery. Five lots of 1,000 tons each were placed. Business of the week closed was in excess of the week previous. Inquiries for small tonnage continue as before and numerous sales of small lots have been made. Otherwise the market conditions have not changed and quotations have not been altered. Sales of the Hanna furnaces for the remainder of the year are about equal to the expected production and melters are being requested to indicate when shipments are desired, in order that all may be accommodated. Shipments are moving out freely. We quote f. o. b. Buffalo as follows:

No. 1X foundry	$16.00 to 16.50
No. 2X foundry	15.50 to 16.00
No. 2 plain	15.00 to 15.50
No. 3 foundry	15.00 to 15.50
Malleable Bessemer	16.00 to 17.30
Gray forge	14.75 to 15.25
Charcoal	20.25 to 20.75

Finished Material.—The week has been quiet among the finished material people and some quarters report a slump in business as compared with the preceding week. Inquiries continue to come along. Several representatives find an increase in these, but not in actual business.

ST. LOUIS.

Good Tonnage of Pig Iron Sold and Many Inquiries Pending.

Aug. 31.

Pig Iron.—Inquiries and orders for pig iron in the St. Louis territory last week aggregated a large tonnage, and prospects are bright for a continuance of buying activities for some little time. The inquiries will figure up 5,000 tons for shipment over the remainder of the present year and 2,500 to 3,000 tons for shipment over

the first quarter and half of next year. Not many furnaces show a disposition to enter business for next year's shipment. The inquiries were made up of lots ranging from 100 to 1,000 and 2,000 tons, and the actual tonnage placed was very satisfactory. Most of the southern iron brought $13, Birmingham, for No. 2. There is not much interest in basic iron in this territory, it is asserted, at the present time. The 2,000-ton lot inquiry which has been out from one of the large car plants for some time has not been placed. St. Louis prices, delivered, to which the Birmingham freight of $3.75 has been added, follow:

No. 1 southern	$16.75 to 17.25
No. 2 southern	16.25 to 16.75
No. 3 southern	15.75 to 16.25
No. 4 southern	15.25 to 15.75

Coke.—The market for coke is about the same as report for last week, prices ranging from $2.25 to $2.75 for best selected 72-hour Connellsville foundry coke, the higher price for immediate shipment and the lower on contracts. Connellsville best selected 48-hour furnace coke can be had from $1.50 to $2 ovens, and there is some smelter coke offered as low as $1.40 ovens Virginia and West Virginia coke is quoted at $2.25 to $2.75 ovens. The freight rate to East St. Louis is $2.80 and to St. Louis $2.90, and $2.70 on Virginia coke when destined beyond St. Louis.

Old Material.—The market has shown a steady improvement for several weeks, with some advances in prices owing to repairs that railroads are making. The outlook is encouraging, with a generally improved condition. Our quotations follow:

Cast iron borings, free from foreign material, net ton	$ 6.00
Steel axle turnings, gross ton	12.25
Steel railroad axles, net ton	$17.50 to 18.50
Iron railroad axles, net ton	18.50 to 19.50
Miscellaneous steel scrap, gross ton	12.25
Old car wheels, gross ton	14.50 to 15.50
No. 1 railroad cast scrap, net ton	12.00 to 12.50
Heavy machinery cast, net ton	13.00
Stove plate and light cast, net ton	10.50
Sheet iron, net tons, uncut	5.00
No. 1 railroad wrought, net ton	11.00 to 12.00
Railroad malleable, net ton	11.50
Heavy melting steel, net ton	11.50

BRITISH IRON MARKET.

Cheerful Reports Still Received—Little Change in Prices.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Aug. 22.

The slightly more cheerful reports of a week ago are repeated, and in many districts the stronger tone is maintained. The Middlesbrough market is more cheerful so far as higher qualities of iron are concerned, but the lower qualities are said to be a drug on the market, and there appears every probability that the unsalableness of these grades will tend to increase. Many works that consume the lower qualities will cease operations shortly and stocks are bound to increase in consequence. Walker, Maynard & Co., as the result of a strike at present proceeding at their works, will damp down three furnaces, and this will reduce by over 2,000 tons the amount of high-class Cleveland iron produced, with a reduction of 2,500 tons in the amount of coke consumed by the furnaces of this firm. Yesterday's quotation for Cleveland was 51s 7½d ($12.63), compared with 51s 6d ($12.60) the previous day, and 50s 10d ($12.34) for three months. During the past two weeks, London houses have increased their buying, and it is rumored that this is on behalf of American houses who desire to safeguard themselves against any sudden or sharp advance in American iron. The amount purchased aggregates 25,000 tons, but it is said the Americans do not desire the iron to be shipped; only to retain it in order to check the American ironmasters. Locally the market reflects the cheerfulness which has set in at other centers, but though the strength of a week ago is maintained, it cannot be said that there is any distinct advance. Some purchases have been made at as much as one shilling above last week's figures. The amount of iron in store at Connal's yesterday was 57,463 tons, an increase for the month of 5,145 tons, and the large proportion of the iron in stock is Cleveland No. 3. The quantity of Cleveland pigs exported this month is nearly 4,000 tons less than a month ago, and nearly 30,000 tons less than in August last year.

Finished Material.—There is a distinctly firmer tone about the local market, and optimism is on the increase. The increased buying would seem to support the anticipation expressed by many makers in the gloomy period that the autumn would see increased briskness in the trade.

The plant of the Providence Steel Casting Co., Providence, R. I., has been sold by the receiver, A. S. Johnson, to Frank Stender, a contractor of that city, who will use it for the manufacture of cement blocks. The property, a steel structure about 75 x 200 feet, with complete Tropenas equipment, cost over $100,000; it was sold for $7,350. The plant has been idle about two years.

METAL MARKET

CHICAGO.

Sept. 1.

The metal market has shared in the better feeling which pervaded most lines of business. Demand for copper has improved and prices are inclined to greater firmness. We quote Chicago delivery, as follows:

Lake copper, carload lots, 14c to 14¼c; casting, carload lots, 13¾c to 14c; pig tin, 31c to 31½c; spelter, 5c to 5.10c; pig lead, desilverized, 4.75c to 4.90c in 50-ton lots; corroding, 4.90c to 5c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c list f. o. b. LaSalle in car lots of 600-pound casks; Cookson's antimony, 11c to 11½c; other grades, 10c to 10½c.

Scrap metals are not so strong as a week ago, and some recessions in prices have occurred. We quote dealers' buying prices as follows: Copper wire, 11½c; heavy copper, 11½c; light copper, 10½c; heavy red brass, 10½c; heavy yellow brass, 8½c; light brass, 6½c; No. 1 red brass borings, 8½c; No. 1 yellow brass borings, 7½c; brass clippings, 8½c; tea lead, 3¾c; lead scrap, 4c; zinc, 3¼c; tin pipe, 25c; tin foil, 20c; pewter, 17c; electrotype plates, free from wood, 4¼c; electrotype dross, 2¾c; stereotype plates, 4½c; stereotype dross, 3¼c; prime slab zinc dross, $55 per ton.

NEW YORK.

Sept. 1.

Copper.—There has been considerable trading on speculation and consumers have picked up a number of lots at desirable prices, but on the whole the level is lower than a week ago and the market is not particularly active. The opinion is expressed that the speculative element has been largely driven out of the market, and the outlook is correspondingly stronger. We quote: Lake, 13⅝c to 13¾c; electrolytic, 13½c to 13⅝c; casting, 13¾c to 13⅜c.

Pig Tin.—In the absence of any buying of importance by consumers and with the foreign market weak, the domestic situation has eased off somewhat. Both spot and future metal can now be had at about 29c, New York.

Pig Lead.—The market is quiet and unchanged from that of a week ago, except that the asking price is slightly lower. We quote 4.57½c to 4.60c, New York.

Spelter.—The situation is slightly stronger, as smelters are hardly turning out enough to meet current re-

quirements and stocks have been drawn on heavily. We quote 4.70c to 4.75c, New York.

Antimony.—Prices are unchanged at 8¼c for Cookson's, 8c to 8⅛c for Hallett's, and 7½c to 7¾c for ordinary brands.

ST. LOUIS.

Aug. 31.

Lead and Zinc.—The market for zinc ore got a feeble start at Joplin last week at $36 a ton, growing stronger toward the end, until the base price reached $37, with $39.50 as the highest figure paid for extra choice ores. Some low-grade jack sold on an assay basis of $35 a ton. Silica brought from $18 to $20 a ton, with $22 for the better grades.

Lead showed a slight decline over the preceding week, the price being $30.50 per 1,000 pounds.

Gary Harbor Contract.—The contract to build a breakwater at the new Gary, Ind., harbor has been awarded by the United States Steel Corporation to the Great Lakes Dredge & Dock Co. The outer arm of the breakwater will extend into the lake a distance of 3,200 feet, and will be built in 45 feet of water. It will be 140 feet wide at the base, and 30 feet wide at the top. Work is to begin at once, and the cost will be close to $1,000,000.

Files Financial Statement.—The Aluminum Co. of America, formerly the Pittsburg Reduction Co., a Pennsylvania corporation, in a statement filed with the secretary of state of Massachusetts, as to its financial condition Dec. 31, 1907, shows total assets of $13,190,568. This is divided into real estate, $758,493; machinery, construction and equipment, $7,015,182; merchandise, $572,673; manufacturers' stock in process, $548,118; cash and debts receivable, $2,574,102; patent rights, $177,000; good will, investments, $1,545,000.

Builds Electrical Locomotive.—An electric locomotive, the largest ever turned out in Indiana, has been completed by the Indiana Union Traction Co. in its Anderson, Ind., shops. It is to be used in moving coal cars and other heavy loads about the shops and power house of the company. The engine is 30 feet long over all, weighs 80,000 pounds and has 800 electric horsepower applied to the drivers. It is thoroughly equipped for switching and has a pantagraph trolley.

MILLIKEN RECEIVERSHIP EXTENDED.

The receivers of Milliken Bros., Inc., who have been in charge of the big steel plant on Staten Island for the past 15 months, have been granted an extension until Oct. 1. Early this week the receivers filed a report stating that unavoidable delays had arisen in the completion of plans for a reorganization, mention of which had been made in a previous report, but expressing the opinion that these plans would be in definite shape within a short time. The receivers accordingly asked for a brief extension, arguing that the shutting down of the works would result in the destruction of the organization, disturb its business continuity and otherwise impair the opportunities for a successful reorganization. Their request was granted. Under the receivers a number of important structural contracts have recently been taken.

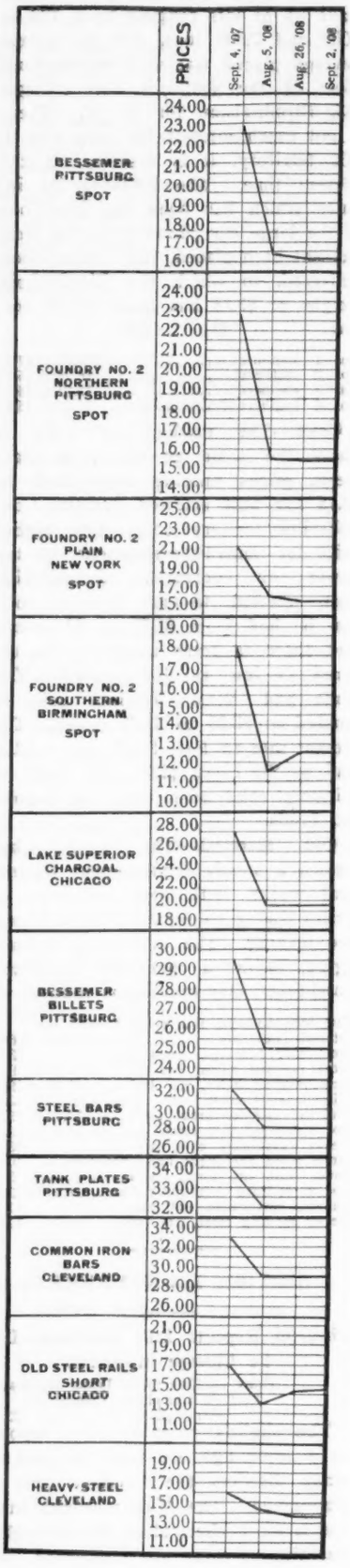
BELGIAN EXPERT ON MINING.

Victor Watteyne, a Belgian mine expert, has arrived in this country for the purpose of investigating American coal mine operations, and to advise methods for preventing mine disasters. The present rate of mine casualties in Belgium is much smaller than in the United States. Mr. Watteyne will make his investigations in conjunction with Herr Meissner of Germany, Capt. Arthur Desbrough, chief of the mines of Great Britain, and representatives of the United States geological survey. All the principal coal fields of the country will be visited. In connection with a conference with Mr. Watteyne at Pittsburg, H. M. Wilson, chief engineer of the United States geological survey, is reported to have declared that at the present rate of consumption the coal resources of the United States will be exhausted in 200 years.

The Pennsylvania Coal & Coke Co., capital $100,000, has been chartered in West Virginia by F. J. Thomas, A. L. Thomas, M. G. Beatty, and Thos. J. Prather, Meadville, Pa.; D. S. Swaney, Pittsburg; Huston S. Williams and Owen R. Brownfield, Fairchance, Pa. The company will operate in Braxton county, W. Va., where it recently acquired an extensive acreage of coal land.

The Algoma Steel Co.'s rail mills resumed operating Sept. 1, orders for rails having been received from the Canadian Pacific and the Grand Trunk railways.

PRICE CHART.



MODERATE IMPROVEMENT

In Demand for Machinery on the Pacific Coast—Crude Materials Dull.

Office of THE IRON TRADE REVIEW,
Seattle, Wash., Aug. 28.

Mixed conditions exist in the iron trade of the Pacific northwest, but there is no doubt that there is a tangible revival of business being experienced, which is gradually manifesting itself in various departments of the trade. In general, the demand for finished lines and for eastern machinery is approaching normal, while the market for pig iron, castings and primary products is extremely dull. The reason for this is not far to seek. The recent rise in the price of both copper and lead has resulted in heavier sales in mining machinery; continued activity in railroad construction in Washington and Idaho, coupled with the development of several new logging roads, is causing railroad and contractors' supplies to move freely, while the plant improvements that various firms have had occasion to make have sustained the demand for machine tools and shop equipment. On the other hand, the dullness of the lumber trade and the dearth of development of new industrial projects has made business in logging and mill machinery, the heaviest line of manufacturing done in the northwest, extremely light. As a result, the foundry business is practically lifeless; the market for castings is demoralized and little effort is being made to maintain prices. The pig iron and coke markets are in the same category. Conditions are better on the coast than in the inland empire district east of the mountains. In the Spokane territory, No. 2 southern foundry iron is quoted at $25; No. 1 Scotch pig, $28 to $29.50; scrap iron of good remelting quality $18 to $20; Fairfax coke from western Washington at $10.50, and British Columbia coke at $9.50 per short ton.

The Crows Nest Pass Coal & Coke Co., which has recently been handicapped by the devastating fires in and around Fernie, B. C., announces that it will be ready to resume regular deliveries in three weeks. Foundries depending on Fernie coke have thus far experienced little inconvenience resulting from the troubles in the producing district.

The Pacific Mfg. & Supply Co., founder and machinist, Spokane, Wash., announces that it is making a specialty of high grade brass and bronze castings, buffing, finishing and plating. Experienced melters from Chicago have been employed and every effort is being made to raise the quality of brass cast in this region to a par with the best eastern product. The firm reports a good volume of business, is now operating a two-pot coke furnace and contemplates the purchase of a new furnace in the near future.

The Union Iron Works, Spokane, reports a reasonable volume of business and announces that it has spent $25,000 in the past few months on plant improvements. These include new molding machines, four of which were designed and built by H. E. MacCamy, superintendent of the plant; a new 30-foot air lift; an overhead single rail trolley serving the flask yard, and additional storage and shipping facilities.

Thomas Van Fear, representing the International Association of Machinists, is visiting Spokane for the purpose of organizing a metal trades association that will include all the iron workers' unions in the city, and will be a section of the central labor body. Since the loss of their strikes, the iron molders' and boiler makers' unions have been rather demoralized, and it is hoped that the concerted action and closer organization of all the iron trades will strengthen the labor ranks in this region.

It is expected that work will commence in the near future on the extensive power and industrial developments planned by the Chicago, Milwaukee & St. Paul Ry. interests for the upper St. Joe river in Idaho. This is the largest power development under way in the northwest. The preliminary work is completed, and the local consulting engineer is now in Chicago arranging for the commencement of actual work.

The Washington Steel & Bolt Co., Edmonds, Wash., near Seattle, manufacturer of bolts, nuts and rods, is completing the preliminary arrangements for the erection of a rod and bar rolling mill of 100 tons daily capacity. The mill is to be run in connection with the company's present works at Edmonds.

Receivers of the Pope Motor Car Co. have announced an offer of $200,000, which has been made for the Waverly plant at Indianapolis by Herbert H. Rice and Wilbur C. Johnson. The receivers announce further that they have submitted to the New Jersey court a petition for instructions as to the proposition.

SUMMER EXCURSION

Of Canadian Mining Institute—Coal and Steel Plants Visited.

Toronto, Can., Sept. 1.—The summer excursion of the Canadian Mining Institute, embracing about 50 prominent mining men, including a number from Great Britain, Germany and Belgium, left Quebec Aug. 24 for Sydney, N. S. The party visited Glace Bay Aug. 26 as the guests of the Dominion Coal Co., accompanied by President James Ross, General Manager G. H. Duggan, Charles Fergie, superintendent of mines; Lieut.-Gov. Fraser, C. J. Coll, president of the Nova Scotia Mining Society, and other prominent local men. They inspected collieries Nos. 2, 6, 7 and 9 and expressed themselves surprised at the extent of the development of the coal industry in Cape Breton. The visitors were entertained at luncheon by the Dominion Coal Co. at the Technical School building. In the evening they were the guests of the Nova Scotia Mining Society at an informal smoker at the Sydney Hotel, where addresses of welcome were delivered by Lieut.-Gov. Fraser, on behalf of the province of Nova Scotia, and by President C. J. Coll of the Nova Scotia Mining Society.

On Aug. 27 the excursionists were the guests of the Dominion Iron & Steel Co. and visited the plant at Sydney in the morning. The German and Belgian mining experts were particularly struck with the extent and thoroughly modern equipment of the works and were lavish in their expressions of appreciation of the enterprise displayed by the company. Luncheon was served in the company's dining room, and in the evening the visitors were given a dinner at the Sydney Hotel. The next stage in the itinerary of the tour is the Acadia Coal Co.'s colliery at Stellarton, N. S.

The coroner's jury investigating the York, Pa., rolling mill boiler explosion, Aug. 10, in which 10 men were killed and 19 others injured, has brought in a verdict charging the Susquehanna Iron Co. with negligence in failing to provide either steam or glass water gages for the boiler; in firing the boiler when the iron shell had been pitted and corroded until it was not more than 1/16 inch in thickness in some places; and in not having a competent boiler inspector go over the boiler.

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STANDARD SPECIFICATIONS FOR OLD MATERIAL.

The importance of the old material branch of the iron and steel industry is not readily appreciated beyond those directly concerned in its production and consumption. It is, in fact, one of the leading factors that make up this great field of commercial activity, and it represents the effort that is constantly being made to conserve the store of iron and steel that has already appeared in marketable form from blast furnaces and mills. As has been repeatedly stated, the output of iron and steel is not "consumed" in the ordinary sense of the word, but is constantly adding itself to the serviceable iron and steel wealth of the country, which fulfills its purpose and then, following a regular process of time, finds its way back to the mill furnaces to be reworked and replaced upon the market. That only a comparatively small proportion of the iron and steel produced is lost to mankind in this cycle of operations, is due to the economies of present mill development and to the activity of those engaged in collecting the discarded material.

The steady gain in open-hearth furnace production which has recently characterized iron and steel history has tended to increase and emphasize the important position occupied by old material. The production of open-hearth ingots and castings in the United States in 1907 reached 11,549,736 gross tons, and under prevailing furnace practice it may be safely estimated that fully 5,500,000 tons of scrap were consumed or rather remelted with pig iron to produce such a tonnage of crude steel. The additional scrap entering into foundry, iron mill, crucible and miscellaneous steel works operations would increase the consumption to approximately 8,000,000 tons. As the companies operating both steel works and finishing mills are consumers as well as producers of scrap, and utilize most of their own material direct, the figure of total consumption is considerably in excess of the tonnage actually bought and sold in the open market. Taking into account the new capacity now actually under construction as well as the prospects for its continued advancement, it is clear that the open-hearth steel industry will steadily grow in favor at the expense of the Bessemer process, and that the market for old material will be correspondingly enlarged.

At present the situation in old material is lacking the uniformity in practice which may generally be found in other iron and steel lines. There is a wide diversity of ideas among buyers and sellers as to the dividing line between grades of material, as well as an absence of a common thought in the ordinary matters of the market. A number of consumers, in attempting to solve this problem, have incorporated their own ideas and experiences in formal specifications which they ask dealers to fill in their business transactions with them. The average dealer has his own views upon this subject, and as a consequence there is frequently a marked variance of opinions apparent which often results in summary rejection of the shipment.

Recognizing this condition as being uneconomic, unnecessarily confusing and a real handicap upon the industry, efforts toward the standardization of present practices are now being made. The railroads of the west have taken the initiative in this movement, and as a result a standard classification of railroad scrap has been adopted by them.

A standard classification of old material sufficiently flexible to apply to different conditions is desirable, and would be welcomed by both producers and consumers as a step toward the betterment of prevailing conditions. But it is not to be overlooked that to harmonize the conflicting elements in the market would be no small task, because of the many and varied uses and the particular requirements to which scrap is now being subjected. This condition appears to be fully appreciated by those who are working toward some remedy of existing difficulties.

Standardization of practice in iron and steel lines as far as possible is a modern undertaking, and recent experiences have proven that greater co-operation between buyers and sellers works clearly in the direction of the most good for all concerned.

IRON AND WOOD.

So much has been said of late regarding the depletion of our forests that the impression may be created that we are passing into a position unique among nations, of not having any timber supply of our own. Such is distinctly not the case. However serious may be the present rate of drain upon our forests, if there is any uniqueness in our position among nations it is that of still having an immense area of untouched timber land. It is not that our forests, as a natural supply to a nation, have become small, but that the present area is small compared to that which once existed. We are driven towards forestry not because the supply is scant, as such supplies go throughout the world, but because we have been tending rapidly towards the position of being reduced to the level of the older nations.

There is no precise and trustworthy

estimate of the acreage of forest in the United States. The accepted estimates run from 500,000,000 to 700,000,000 acres, or from five to seven acres per capita. That is an enormous supply compared with some of the continental countries. Germany and France each have but three-fifths of an acre per capita. Russia in Europe has about four acres per capita of the entire population, but, including the forests in Asiatic Russia, has nearly seven acres per capita.

The future of the iron and steel industry in the United States will be influenced in very important ways by the competition between wood and iron and the iron trade should familiarize itself with the situation and prospects. Current thought sometimes takes the form of assuming simply that, as the timber supply decreases, iron will take the place of wood. The tendencies cannot be measured by any such rule.

The German forests, as noted, amount to three-fifths of an acre per capita. The present American forests cover between 8 and 12 times as large an area per capita, yet our forests are being depleted, while five-sixths of the German demand is supplied by the three-fifths of an acre per capita, so perfect has German forestry become and so small is the domestic demand. A century and a half ago, Germany felt a scarcity, and since that time German forestry has led in point of thoroughness; the results are now worked out almost with laboratory exactness, and the output of wood per acre has been increasing over a long period of years.

Measured by the German standard, the United States has no need of forestry, but our own standard of production and consumption are altogether different. With 10 times the German area per capita, our current rate of cutting is more than double the most favorable estimates of the rate of growth. Our consumption is vastly greater than that of Germany, while the rate of growth is vastly less. Scientific forestry is making rapid strides in the United States, and it is evident that within a decade, or a quarter century at most, scientific forestry will have been applied to the United States to the full extent which the conditions may at that time warrant. The government reserves alone in the United States amount to about one and three-quarter acres per capita, against a total of three-fifths of an acre per capita in Germany, with but 32 per cent of that acreage owned by the government. If, then, our population should double, the government forest lands alone could supply the population with considerably more timber than Germany uses, counting the German production and the imports together.

Other continental nations have different standards. France has the same forest area per capita of population, three-fifths of an acre, as Germany, but while Germany produces five-sixths of her wood supply, importing one-sixth, France produces but one-third, importing two-thirds.

In the comparison between Germany and the United States, there is no hint of direct competition between iron and wood, since while the United States has had a vastly greater supply of wood than Germany, the production of pig iron per capita has been one-third of a ton, while in Germany the production has been one-fifth of a ton, and that despite the fact that Germany exports a much larger proportion of her iron production than does the United States. The needs or desires of the people are altogether different, the people of the United States requiring much more both of wood and of iron than the people of Germany.

The talk of a famine in any commodity is useful to bring about measures of economy and conservation, but as regards either wood or iron in the United States there is not the least occasion for alarm. Scientific forestry can easily overtake the diminution which is now occurring in the timber supply, with a most ample area on which to work to grow for the future a vastly larger annual supply per capita than readily suffices for Germany, while on the other hand the utilization of our lower grade iron ores can easily supply a greater quantity of iron than can possibly be put into use, with all the growth in population which the country is otherwise capable of supporting.

It is not a question of famine or exhaustion in the one commodity or in the other. It is a question of prospective needs and of prospective cost to supply those needs. Scientific forestry cannot produce wood as cheaply as it has been sold. A higher standard of value for wood must prevail when it is grown through the active effort of man than when it is cut down, possibly for the chief purpose of clearing the land for cultivation. A higher standard of value for iron now prevails when the necessity is faced of working lower grade ores than prevailed when ore almost up to the theoretical standard of excellence was being mined with no thought of possible exhaustion. The competition between wood and iron in the more distant future will be a competition between scientific methods of forestry and methods of producing iron. The latter are already scientific and admit of relatively little improvement. Scientific forestry, on the other hand, has been begun, but has not progressed far enough for its costs to leave an impress upon the price at which wood is sold.

Mill Machinery For Gary.—The Steel Corporation during the past few days let contracts for a universal mill and a 14-inch and 18-inch bar mill at the Gary, Ind., plant. The universal mill will be built by the Morgan Engineering Co., of Alliance, O., and the two bar mills by the American Bridge Co. at its Pencoyd, Pa., plant.

The Pittsburg Limestone Co., Altoona, Pa., which supplies limestone largely to the Steel Corporation plants, has commenced the erection of another large stone crusher at the quarries along Clover Creek, and has increased the working time of its employes from two to five days a week.

A decision has been rendered by Judge Tayler, of the circuit court of the United States, northern district of Ohio, in favor of the Alliance Machine Co. in the infringement suit against the Morgan Engineering Co., on the four girder ladle crane.

LARGEST CRANE ORDER

Of Year Received by Alliance Machine Co. For Gary, Ind., Plant.

The largest order placed for electric traveling cranes during this year in the United States was received Saturday by The Alliance Machine Co., Alliance, O., for the Gary, Ind., plant of the United States Steel Corporation for the new billet mill, etc. This order consists of 17 cranes, as follows: One 40-ton crane, three 20-ton cranes, three 50-ton cranes, three 10-ton cranes, two 5-ton cranes, three 15-ton cranes, two 75-ton patented ladle cranes of 75 tons capacity each.

Among other orders received recently by this company are: One 5-ton crane for the Pittsburg Plate Glass Co., Pittsburg; one 10-ton crane, Whitaker-Glessner Co., Wheeling; one 50-ton crane, United Engineering & Fdy. Co., Pittsburg; one 10-ton crane, Camden Iron Works, Camden, N. J.; one 10-ton crane, Pittsburg Steel Co., Pittsburg; one 10-ton crane, National Transit Co., Oil City, Pa.; one 25-ton crane, National Transit Co., Oil City, Pa.; three 5-ton crane, Cleveland Frog & Crossing Co., Cleveland; one 15-ton crane, Pittsburg Steel Co., Pittsburg; one 5-ton crane, Pittsburg Steel Co., Pittsburg; one 10-ton crane, Pittsburg Steel Co., Pittsburg; one 10-ton crane, Chicago Railway Co., Chicago; one 10-ton crane, Worth Bros. Co., Coatesville, Pa.; one 25-ton crane, Carnegie Steel Co., Homestead works; one 10-ton crane, Inland Steel Co., Indiana Harbor, Ind.; one 40-ton crane, Newport Rolling Mill, Newport, Ky.; one 5-ton crane, Newport Rolling Mill, Newport, Ky.

These contracts in connection with the government gun carriage contract, recently secured by the company, insure full time and full pay for all of their employes for the remainder of the year, as its shops have been full handed and running full time throughout the present period of depression.

New Stack Blown In.—The newly completed blast furnace of the Hamilton Iron & Steel Co., near Hamilton, O., was blown in at 11:15 A. M. Aug. 22. The torch was applied by Anna Margaret Field, five-year-old daughter of R. E. Field, secretary-treasurer of the company, and the furnace will hereafter be known as the Anna Margaret stack. The furnace will have a daily capacity of about 300 tons.

Building Boiler Plant—The construction of the new plant of the Heine Safety Boiler Co., St. Louis, is proceeding, the Riter-Conley Construction Co. having secured the contract for 1,000 tons of material to be employed on the main building, 140 x 400 feet. The plant will also include a flange shop 60 x 80 feet, and a power house 75 x 80 feet, both to be of steel construction with brick walls and cinder concrete roof. The machinery will be electrically driven. The company has a site 6½ acres in extent, with a frontage of 770 feet on terminal railways. The cost of the building and equipment will be approximately $250,000.

STRIKE OF ALABAMA COAL MINERS IS CALLED OFF.

The strike of the Alabama coal miners, which was called July 6, was declared off by miners' organization officers Aug. 30. Several conferences had been previously asked by President Lewis, of the miners' organization, who proposed arbitration and other suggestions. However, all such tentative advances were stoutly declined by the iron and steel manufacturers and large individual mine owners, who repeatedly declared that they proposed to run their mines "open shop" and would continue the contest until they won.

The progress of the struggle was marked by deeds of violence unprecedented in the history of Alabama, murder from ambush, dynamiting of non-union miners' houses and families, and like acts of atrocity. Governor Comer himself took charge of the situation, called out the armed militia of the state and finally forbade for sanitary and humane reasons the free life in tents of dispossessed strikers. On the night of Aug. 29 the governor announced in a conference with President Lewis and leading business men of Birmingham, Ala., that unless the strike were called off by 10 A. M. the following Monday, he would summon the state legislature in special session to deal with the terrible condition. The capitulation of the strikers followed the next day.

The Fred M. Prescott Steam Pump Co., Milwaukee, Wis., has received an order for a cross-compound Corliss pumping engine to be used for brine circulation in connection with the Gayley dry blast apparatus which is being installed at the plant of the Northwestern Iron Co., Mayville, Wis. The company has also recently completed the installation of three cross-compound Corliss engines for the same purpose at the South Chicago works of the Illinois Steel Co.

NO RIGHTS WAIVED

By International Harvester Co. Employes Who Join Benefit Association.

The International Harvester Co. has made announcement at Chicago, through C. S. Funk, general manager, of a plan to provide the 30,000 employes of the company with their own sick benefit and insurance association. The plan provides that every employe who contributes 2 per cent of his wages to the fund thereby becomes a member of the association and entitled to all its benefits. He is thus provided with insurance against death from sickness and accident, and is given half pay while disabled by illness or injury. Two years' wages are given the family of a man who is killed by accident either on or off duty, and he receives the same for the loss of both feet, both hands or both eyes. In case of death from natural causes, one year's pay is paid to the family.

The Harvester company pledges itself to contribute $25,000 to the fund if 50 per cent of its employes join, and $50,000 if 75 per cent become members. The company agrees that in joining the association, employes do not waive any legal rights against the company in case of accident. The employes chose one-half of the board of trustees, and the company guarantees the safety of the fund. A pension fund is also provided, to whose benefits an employe is entitled after 20 years of service if he has reached the age of 65. Retirement at that age is optional, but at 70 it is compulsory. The entire plan went into effect the first of the month.

Will Build Foundry.—The T. H. Symington Co., Baltimore, advises that it is planning to construct a large malleable iron foundry at an early date, preliminary plans having been about perfected. The company is considering propositions from Rochester and Batavia, N. Y., as well as Corning, N. Y., where it has a plant, but it is not yet definitely decided where the new plant will be located.

The United States customs department has acquiesced in the court of appeals' decisions on boiler flues and hematite ore both adverse to the government. The former, arched Purves furnaces, were held dutiable at 2 cents per pound under paragraph 152 and the latter at 40 cents per ton under paragraph 121 of the tariff.

PLANTS RESUMING

In the St. Louis District—Many More Men Employed.

St. Louis, Sept. 1.—Many plants on the east side of the Mississippi river, which have been closed down or operating only on short time, will resume work with full shifts this week, and many employes who have been temporarily out of work will renew their acquaintances with the paymasters.

In the tri-cities—Madison, Venice and Granite City—the industries are on such a large scale that a greater number of employes are affected than in any places of the size in the country. The Granite City Iron & Steel Mills, which always closes down in July and August on account of the heat, will resume work more promptly this year than usual.

Fire was started last week in the cupola at the steel mills of the National Enameling & Stamping Co., a week being required to get the furnaces up to the right temperature. The hot mills will be started Wednesday, with a force of 500 workmen. One week hence, the tin mills will commence work, bringing the total force in this establishment up to 1,400 men. Arrangements have been made to open the stamping works proper within a week or 10 days in all departments. Twelve hundred operatives are employed there when the plant is working to its full capacity.

The American Steel Foundries, whose employes mostly live in St. Louis, is engaged in repair work, and has let a contract for a $30,000 addition to the plant, to be used as a pattern department. A great quantity of raw material is collecting, however, and when the plant starts up it will work to its full capacity.

The Commonwealth Steel Foundry, also at Granite City, has increased its force to 300 men. At the works of the N. O. Nelson Mfg. Co., at Leclaire, every shop is working full force. L. D. Lawlin, secretary of the company, says the outlook is bright, and the increase in orders probably will cause the plant to continue working full time throughout the winter. The plant is operated by N. O. Nelson on the profit-sharing plan. The factories produce brass fittings, castings, machine mantels and cabinet work, marble work, bath tubs, etc. Business has been such that the regular semi-annual dividend to stockholders, employes and customers will be declared in December, as usual.

The foundry of the Sodemann Heat & Power Co. at Edwardsville is rushed with work and twice this summer the company has been forced to advertise for help. All of the departments are now filled, the working force being 20 per cent greater than at any time last year. President Wm. Sodemann says orders are increasing daily.

Smoke is pouring from many plants in Alton, Ill. The miners' tools and shovel factory of Beall Bros. is again running full force and employing several hundred men on full time.

The Federal Lead Co., with its big reduction plant a short distance below Alton, had 300 employes on its pay roll when the plant opened this morning. The Duncan Car & Foundry Co. is running with a large force of men and has orders ahead. The Hapgood Plow Co. has plenty of orders to justify it in keeping a full crew at work.

The Illinois Glass Co., the largest employer of labor in Alton, will start about Sept. 15, with a force of about 4,000 employes.

Announcement was made Saturday that the Sendelbach Wheel Co. of East St. Louis, recently destroyed by fire, probably would be rebuilt at an early date. The resumption of the glass works, and the employment of additional help in the aluminum works in East St. Louis have given considerable impetus to business and financial affairs in that city. At the iron and steel mills in East St. Louis, much hope is expressed that within a few days orders will be received that will keep the mills running until Christmas.

NEW COMPANY SECURES SHELBY, O., HOLDINGS OF NATIONAL TUBE CO.

Officers of the Ohio Seamless Tube Co., as the new company organized recently by business men of Shelby, O., will be known, have received word from the officers of the National Tube Co. that the Steel Corporation finance committee at New York has approved the contract between the Shelby company and the National company, whereby the new corporation acquires all of the real estate holdings of the National Tube Co. at Shelby. Some of the buildings had not been damaged at all by the recent fire.

The Belfont Iron Works Co.'s stack at Ironton, O., is being repaired and will probably not be ready to blow in before Oct. 15.

LARGE PROFITS.

Shown by a British Firm—Labor Trouble Settled.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Aug. 22.

Guest, Keen & Nettlefold have issued their report to be presented at the shareholders' meeting, due shortly. The balance sheet shows a profit of £454,716 4s 9d after making provision for bad and doubtful debts. To this has to be added the sum of £186,588 6d. brought forward from a year ago, making an available balance of £641,304 5s 5d. After the deduction of debenture interest for the 12 months, and interim dividend on preference and ordinary shares amounting to £161,569, there remains £479,735 5s 5d. The directors recommend the payment of 5 per cent per annum dividend on preference shares for the six months ended June 30; a dividend of 10 per cent per annum on ordinary shares free of income tax for the six months ended June 30, making 10 per cent for the year, and to pay a bonus of 1 shilling on each ordinary share. They further propose to place to the fire and accident fund £50,000, and to place to reserve £100,000, carrying forward to next year's account £190,235 5s 5d.

The labor trouble at Wednesbury, mentioned recently, has been happily terminated by the acceptance by the men of terms arranged at a conference between the men's leaders and Dudley Docker, chairman of the board of directors of the Old Park Works, Wednesbury. The terms include the reinstatement of the dismissed workman, Plackett, around whose dismissal the trouble centered, and the promise by Dudley Docker of his own personal management at the works.

A terrible explosion occurred on Aug. 18 at the Abram coal pit near Wigan. The shock destroyed the winding gear and cage and 75 men perished. About 30 of the bodies had been recovered when fire broke out, and it became necessary to flood the workings.

Failing to get a majority of striking coal miners to return to work at the Hudson mine in Indiana, President Lewis, of the United Mine Workers, has revoked the charter of the local organization to which the Hudson miners belong, and they are now outside of the union. He announces that the next step will be to put union men in the mine.

PERSONAL.

F. A. Burr, sales manager for the Tennessee Coal, Iron & Railroad Co., during the past week, spent several days in Pittsburg.

Benjamin Nicoll, general manager of sales of the Wharton Steel Co., will return from Europe about the middle of the month.

C. H. Zehnder, vice president of the Scranton Bolt & Nut Co., formerly president of the Allegheny Ore & Iron Co., is in Europe.

President W. C. Runyon, of the Struthers Furnace Co., will sail, Sept. 5, for New York, after spending two months in Germany and France.

W. G. Clyde, assistant general manager of sales of Carnegie Steel Co. is combining business with pleasure during a month's trip through Mexico.

H. F. Martin, general manager of sales of the Pennsylvania Steel Co., returned Friday from a brief European trip. He was a passenger on the Mauretania.

President C. W. Bray, of the American Sheet & Tin Plate Co., is spending his annual vacation in the wilds of Canada. He will return to Pittsburg about Sept. 15.

Payson Rankin, of Waukesha, Wis., purchasing agent with the Modern Steel Structural Co. for several years, has resigned to accept a similar position with a steel company at Portland, Ore.

David D. Lamond, of the firm of D. Lamond & Son, contracting engineers, Ferguson block, Pittsburg, accompanied by Mrs. Lamond, sailed Aug. 21 for Europe. They expect to be away about six weeks.

H. B. Morrow, for the past two years electrical engineer and draftsman for the Galena Iron Works, Galena, Ill., has accepted the position as instructor at the Wisconsin School of Mining at Platteville, Wis.

B. F. Jones Jr., president of the Jones & Laughlin Steel Co., is having plans prepared for the erection of an elegant residence at Ridge and Irwin avenues, Pittsburg. The mansion will be one of the finest in Pittsburg.

Little hope is entertained for the recovery of Louis Kissel, the veteran manufacturer of Wisconsin, president of the Kissel Motor Car Co., the Hartford Plow Co., and the L. Kissel & Sons Co., at Hartford, Wis., who was shot recently at Hartford by a disgruntled employe.

F. L. Pinkham, chief clerk of the Kewanee, Ill., works of the National Tube Co., has been appointed assistant to the third vice president, Taylor Alderdice. E. E. Bowman, of the Riverside Works of the company, at Wheeling, has been appointed chief clerk to succeed Mr. Pinkham.

H. S. Lewis, formerly sales agent for Marine Coal Co., has become associated with the Iron City Coal & Coke Co., as sales agent of the coal department of their business.

J. G. Carothers, formerly assistant sales agent of the Cambria Steel Co., Cincinnati, has been appointed assistant manager of sales, with the Carnegie Steel Co., Cincinnati office, succeeding R. A. Bruce, who has been transferred. William F. Vosmer has been appointed assistant sales agent in the Cincinnati office of the Cambria Steel Co., succeeding Mr. Carothers.

OBITUARY.

F. J. Falkenback, chemist for the Goshen Iron Co., Goshen, Va., was drowned Aug. 26 while boating with F. E. Fenton, treasurer of the company.

William Chaplin, vice president of the Welland Vale Manufacturing Co., St. Catharines, Ont., and largely interested in the Chaplin Wheel Works, Chatham, Ont., died unexpectedly at St. Catharines, Aug. 25, aged 69 years. He was born at Brechin, Scotland, and came to Canada at the age of 19. He was a prominent citizen of St. Catharines, where he took an active part in civic affairs and was at one time president of the board of trade.

John Fensom, one of the first men to engage in the manufacture of elevators in Canada, died in Toronto, Aug. 23, in his 80th year. He was born in England and emigrated when young to Massachusetts, where he obtained a mechanical training. About 50 years ago he went to Toronto, where he engaged in the business of manufacturing machinery. Fifteen years later he began the manufacture of elevators and afterwards established the Fensom Elevator Works. This concern was amalgamated with another about two years ago as the Otis-Fensom Elevator Co., when Mr. Fensom retired from the business.

The recent death of W. F. Niedringhaus, of the National Enameling & Stamping Co., and pioneer tin plate man of the country, contributed to the death of his brother, Henry L. Niedringhaus, of 5970 Plymouth avenue, St. Louis, Aug. 31. Mr. Niedringhaus, who had been suffering from nervous breakdown since the death of his brother, was 67 years of age. He was an uncle of Thomas K. Niedringhaus, and had shared the management of the National Enameling & Stamping Works with his brother, the late W. F. Niedringhaus, the founder of the business. Mr. Niedringhaus was born at Blashein, Germany, and came to America with his father and two brothers, Charles and Henry F., when he was 10 years of age.

Frank B. Kleinhans, age 35, a well-known Pittsburg mechanical engineer and author of scientific papers, was killed by a street car in that city on Sept. 1. He was employed by the United Engineering & Foundry Co.

Eagleton Hanson, secretary of the Trenton Iron Co., Trenton, N. J., died at his home in that city Aug. 27, after five months' illness of heart disease. He was born in England in 1842 and was at one time chief accountant of the Pullman Palace Car Co., Chicago. Mr. Hanson was in the employ of the Trenton Iron Co. for nearly 40 years.

MILL ACTIVITY IN EASTERN PENNSYLVANIA.

Harrisburg, Sept. 1.—The Lalance and Gros-jean Mfg. Co.'s tin plate mills will resume operations after six weeks' suspension on Sept. 8. Other Harrisburg plants which are increasing operations are the Central Iron & Steel Co., which is now running part of its open-hearth plant and the Chesapeake Nail Works.

Reports from the various stove manufacturing plants in eastern Pennsylvania indicate that they have a fair amount of work to start their active season and that there are many inquiries which will doubtless be productive of additional business. The Reading plants have a good volume of orders for the forces they have employed.

On the application of Robert G. Spiers, president of the Cross & Speirs Machine Co., Ansonia, Conn., that a receiver be appointed for the company, prior to dissolution of the corporation, Verrenice Munger, of Ansonia, has been appointed. The company manufactures special machinery.

The McMyler Mfg. Co., Cleveland, has obtained the contract from the Toledo & Ohio Central railroad for the erection of a car dumper at Toledo, the work to be completed in time for the opening of navigation next year.

The Nicola Building Co., Pittsburg, has been awarded the contract to erect 30 double frame houses in addition to store buildings, at Acosta, Pa., for the Somerset Coal Co., and a power plant for the H. C. Frick Coke Co., at Arensberg, Pa.

AMONG MACHINERY MAKERS

NEW YORK.

Approach of Fall Brings Improvement, But Business is Quiet.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Sept. 1.

The continued absence from the current machinery trade of any propositions of size, either from railroad or other interests, leaves the market in such condition that tendencies in the general situation are clearly recognizable. It is a fact that, as compared with the volume of business in machine tools and shop equipment during the early summer, the approach of the fall season is bringing a decided improvement. One of the largest houses in the Liberty street district reports its August business as ahead of that of July, up to that time the heaviest month of the year, and the outlook is good for a fairly active fall trade. Inquiries are still chiefly for scattered tools. Railroads are buying very sparingly, though the recent sharp increase in the demand for nuts, bolts, frogs and switches and other supplies indicates that the more imperative repair work is being looked after. There is considerable activity in second hand machinery and some export trade.

It is probable that at an early date the trustees now engaged in liquidating the affairs of the Rockwell Engineering Co. will offer for sale the shop equipment of the plant at 32 Fairmont avenue, Jersey City, N. J. The list includes power plant, machine and pattern shop equipment and miscellaneous supplies, among the more important items being the following: 25 horsepower gas engine complete with tank; Bertsch & Co. universal punch and slitting machine; Robertson power hack saw; two E. C. & B. pipe cutting machines with dies; three large radial drills, two Bickford and one Mueller; L. W. Pond Machine Co., planer, 48 inches x 36 inches x 10 feet; J. J. McCabe double spindle engine lathe, 32 inches x 54 inches x 14 feet; three lathes, one 16 inches x 6 feet, one 13 inches x 5 feet, and one 20 inches x 12 feet, the last of Pond make; Juengst & Sons' shaper, 16-inch stroke; Frasse sensitive drill press; Heald drill grinder; Thornton band saw; Fay & Scott pattern lathe; 30 horsepower upright boiler; A. S. P. Co., air compressor with receiver; assortment of chain hoists; complete blacksmith shop equipment; shafting, pulleys, hangers, etc. J. H. Rogers, 60 Wall street, New York City, is in charge of the property, which may be sold either as a whole or separately. This company is not to be confused with the Rockwell Furnace Co manufacturing melting furnaces and other allied equipment at 26 Cortlandt street.

Scattered buying is being done by the New York Central, the latest inquiry sent out calling for four small lathes for the West Albany shops. It is understood that a large boiler order was recently placed by this interest.

Harvey & Hill, engineers at 50 Church street, New York City, have recently taken a number of important orders for producer gas plants. One of the largest is for a 2,500-horsepower installation for the Southwestern States Portland Cement Co., Eagleport, Tex., 24-hour service, seven days in the week. This operates on Texas lignite. The complete power plant equipment, involving over $500,000, was contracted for only a few days ago after brisk competition, the engines going to the Allis-Chalmers Co., and the generators to the General Electric Co. The Cowham Engineering Co., Jackson, Mich., is the owner of this and seven other cement plants. Harvey & Hill will also furnish the Catskill Cement Co., Cementon, N. Y., with the gas producer for a 175-horsepower power plant operating on anthracite. Koerting engines are to be installed. The Rushmore Dynamo Co., Plainfield, N. J., has contracted for a 200 horsepower gas producer, and the Eagle Lime Products Co., Milwaukee, Wis., is to install two 10-foot producers for rotary kilns in connection with lime making.

The Emigrant Industrial Savings Bank, 51 Chambers street, New York, is receiving bids on the general contract for the erection of its new building; a complete power plant will be included. The Farmers' Loan & Trust Co. is closing bids on an engine and generator.

The Rushmore Dynamo Co., Plainfield, N. J., is making some additions to its plant and expects in the fall to add another engine to its power equipment.

The new twin engine made by the Ironton Engine Co. for the Belfont Iron Works Co., Ironton, O., has been placed on its foundation at the mill, and will soon be ready to run.

CINCINNATI.

Some Elements of Uncertainty—Fair Number of Inquiries.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Sept. 1.

The month of August in point of orders has been fair, considering the depressed conditions existing in the trade generally. There has been considerable inquiry and good lists are being figured on. A feature of the trade appears to be orders from unexpected sources more than the result of inquiry, indicating that installations of new machines are the result of pressing necessity and such orders are placed without extensive shopping. This feature of the situation leaves the manufacturer somewhat in doubt as to the outlook, as inquiries develop a small proportion of orders. This situation of uncertainty as to the immediate future is reflected in the foundries and among boiler makers. Some of the foundries are running full time and full force this week, but have only a few specifications on hand and are therefore dependent upon what may develop from day to day for their future employment. Some of the smaller manufacturers of special machines have a fair run of orders going through and it is more particularly the larger shops with heavy capacity that are finding it difficult to adjust operations to the limited amount of business coming in.

The general business situation, which naturally involves the political outlook, is the principal topic of concern in regard to the future. There is considerable confidence that a material improvement in machine tools and dependent activities will develop by the first of the year. For the present there is a disposition to accept conditions with patience, as the uncertainties surrounding the general business conditions are not expected to be clearly defined until the election is out of the way and the disturbing features of a presidential campaign have been met and passed.

The meeting of the National Machine Tool Builders' Association in New York, in October, promises to be largely attended by Cincinnati manufacturers of machine tools as it is expected that the discussions at the meeting and the personal contact with manufacturers in this industry will be the best means of obtaining information on the general outlook and sug-

gestions as to how this country can maintain its supremacy in foreign markets and meet the domestic necessities.

BOSTON.

Moderate Improvement Expected by Furnace—Dull Summer.

Office of THE IRON TRADE REVIEW, 73-74 Journal Bldg., Sept. 1.

With the close of the regular summer vacation period the heads of departments in the machine tool and general machinery and allied lines are returning to their desks and anticipate at least a slight improvement in business over the summer season.

A glance backward covering the past six months shows a decided dullness in the machine tool business in all parts of New England. A great many of the shops found it convenient to close down during July or August for necessary overhauling and repairs to their plants. With some of them this is a regular feature of the summer's routine, but this year they have closed for a full month where heretofore they had ample opportunity to do this work in a space of 10 days' time. One of the largest concerns in this territory closed for 30 days, this being the first year in its history where more than a 10-day lay-off has been indulged in.

The continuous excessively hot weather probably had a more or less temperamental effect on business also. The present summer has been far above the general average for hot weather shown for a good many years. The general business depression throughout the country in other lines of trade has had a very marked effect on the machine tool trade. Buyers have put off the purchase of new machines, making the old ones do for the present. New and additional equipment purchases have been postponed awaiting a more general resumption of business.

As to the near future, considerable pessimism is expressed in the trade. Some few dealers in accessory supplies, such as valves, packing, etc., state that their business has been "fairly good" all season, and one or two go so far as to say that they really have not felt any effect of the "depression." The consensus of opinion seems to be that the machine tool line will be one of the last to feel the full and complete return of normal conditions.

The Becker-Brainerd Milling Machine Co., Hyde Park, Mass., has completed the first of its improved type of vertical milling machines, which was executed on an order received from the United States government works at Philadelphia, and has received numerous inquiries as well as a very satisfactory number of orders. One of the most recent shipments went to Melbourne, Australia.

The Boston Crude Oil & Forge Co. has just filled an order for 80 of its portable crude oil rivet forges received from a large Pennsylvania structural steel concern and another order for 12 from New York. This concern manufactures a light weight, portable rivet heating forge for the use of structural steel workers and boiler manufacturers. It burns a cheap crude oil for fuel instead of coal and its makers claim for it a number of advantages over the old type of forge, among them being cleanliness, ease and economy in operation and better and faster work. They are placing them with a number of the big concerns.

The Boston Bolt Co. is one of the fortunate concerns that have experienced no cessation in the receipt of orders during the past summer. It has been working full time and is now making plans for the erection of a new five-story brick addition to the present plant. It states that it could use this new addition to good advantage right now if it were completed and fully equipped.

The Julian D'Este Co., 25 Canal street, Boston, reports a good business during the entire season in valves and engineering specialties. Trade has been steady and much more active in its line than might have been expected.

Hill, Clarke & Co., of Boston, have recently filled several very satisfactory orders and have their line baited for a few more which they expect to land. This firm has recently made a number of alterations and improvements in its show room and is better prepared than ever to handle its trade in machine tools, etc.

The American Tool & Machine Co., of Boston, has been running its shops at Hyde Park with a 75 per cent force making up a large reserve stock which it expects to dispose of just as soon as orders are running free again.

MILWAUKEE.

Improvement in Business Conditions is Continuing.

Milwaukee, Wis., Sept. 1.—Machinery manufacturers report that steady improvement in business conditions is still the rule. As an indication of this, many of the Milwaukee and West Allis plants are increasing their working forces and enlarging their outputs.

The great Allis-Chalmers plant at West Allis, is experiencing excellent demand for the style of gas engines turned out by the company. The Allis-Chalmers Co. during the past few months has finished the manufacture of 36 engines, each with a capacity of 3,000 horsepower. The company is also receiving satisfactory orders for air brakes. Excellent demand is being experienced in both the electrical and steam turbine departments.

The West Allis Malleable Iron & Steel Belt Co. has added to its forces several times of late and at the present time is planning on doubling the capacity of the plant.

The Pressed Steel Tank Works Co., which is now manufacturing, is experiencing a revival of business since its new steel barrel has been placed upon the market. This company has purchased additional land and is now making arrangements to double the capacity of the plant.

The Oliver Iron Co. at Marinette, Wis., is planning on doubling the power at its hydraulic works on the Menominee river. The step will result in the installation of much new machinery.

Eugene Bunn & Son, of Oconto Falls, Wis., have purchased a factory site at Forest, Wis., and will immediately begin the erection of a modern machine shop.

Sumner K. Prescott, of the Prescott Iron Works at Marinette, Wis., who made a recent inspection of the Pingret steam rotary engine, recently invented by an Escanaba, Mich., man, is considering the installation of an engine of this type in the Marinette plant.

The West Allis Malleable Iron & Steel Belt Co. has announced that in the future it will receive only apprentices who have graduated from the Milwaukee School of Trades. This is regarded as a very high compliment to the school.

PITTSBURG.

Fair Amount of Heavy Machinery is Being Estimated.

Office of THE IRON TRADE REVIEW, 510 Park Bldg., Sept. 1.

The machinery market in the Pittsburg district is not active, but there is evidence of improvement in some lines. The machine tool trade is light, due in some measure to the absence of the railroads from the market. One of the railroad companies in this territory recently came into the market for tools, and this was the first evidence of any buying from the steam

lines for a number of months. It is estimated that the business of some of the leading sellers will not exceed 40 per cent of last year's total.

In the heavier lines of machinery, conditions are conducive to a better sentiment, since there is a fair quantity of work under estimation. Contracts being placed for equipment for steel mills, however, are few, outside of the United States Steel Corporation. In addition to the requirements for the Gary plant, upon which some of the engineering companies in this territory are now engaged, the Corporation is making extensive improvements at the McKeesport, Ohio and Duquesne works. Some orders for piping equipment in connection with blast furnace construction are being placed. The demand for valves is small, and manufacturers have good sized stocks on hand. The air brake companies are taking little business, due to the apathy of the railroads. The engine demand is not heavy.

The borough officials of Millvale, Pa., have taken bids for pumps with a capacity of 2,000,000 gallons in 24 hours for installation in the pumping station of the borough.

Plans are being drawn for a new power plant for the St. John's hospital, Northside, Pittsburg. Bids on the boilers, engines, dynamos and other equipment required will not be asked for several months.

BUFFALO.

New Business Not Heavy, but Prospects Are Encouraging.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, Sept. 1.

So far as actual contracts are concerned, the machinery market in Buffalo is dull, but there has been a substantial increase in inquiries. It is generally reported that the prospective buyers who were in the market a year ago and dropped out during the slump are in the market again. Some good business is likely to be closed during the next few months. A good deal of the recent business has been with the local and Niagara Falls power companies, which have added equipment and reinforcements to carry them through the winter. The market for small machinery, such as motors and generators, has been good. Machine repair work at the local shops shows an increase. Second hand machinery is dull this week. Several large industries, including the Excelsior Steel Ball Co., will shortly be in the market for new equipment, and if current rumors of new factories in this district be true, the market for heavy equipment should be active at an early date.

PHILADELPHIA.

Business is Dull, But September is Expected to Show Improvement.

Office of THE IRON TRADE REVIEW, 408 Central Trust Bldg., Sept. 1.

The machinery men here are looking for a betterment in September. Nearly all complain that business is dull and it is doubtful if they are on the whole operating on more than a 50 per cent basis.

Dodge & Day, engineers and contractors, 608 Chestnut street, Philadelphia, have prepared plans and specifications for a modern malleable castings plant for the Federal Castings Co., Vincennes, Ind., and will also have in charge the work of construction and equipment. The latter includes several gas-fired regenerative furnaces. The plant will have a capacity of 40 tons.

Among the sales of machine tools made here during the past week, were several cold saws, a milling machine and a floor boring machine by the Espen-Lucas Co., Philadelphia.

The Climax Chain Hoist Co., 2227 Wood street, Philadelphia, has recently sold blocks as follows: Four to one concern in Brazil; four in Canada, and three in Philadelphia. The block is a new one on the market and, as these orders show, is gaining favor.

CLEVELAND.

Automobile Business is Flourishing—New Peerless Buildings.

Office of THE IRON TRADE REVIEW, Browning Building, Sept. 1.

Gradual, although somewhat slow, improvement in general machinery and foundry conditions in Cleveland, has been noted in the past month. Up to this time, the automobile industry, which is an important factor in Cleveland industrial life, has been flourishing, the factories operating to 75, 80 and some even 90 per cent of capacity. The pig iron melt by the makers of heavier castings has shown some improvement, and pig iron sales to Cleveland foundries in the last two months have been factors in the Cleveland market.

Salesmen for supply houses with headquarters in this city report a gradual resumption of the smaller machine shops throughout northern Ohio, and a small but steadily growing number of mechanics being placed at work in the larger plants from week to week. Almost without exception, shop owners have expressed at least modified optimism for the immediate future, while pointing out that at the present time small tools and second hand tools compose the bulk of the sales just at this time as they have in the past three months.

The Peerless Motor Car Co. has authorized the drawing of plans for the first of a group of buildings in practical duplication of the present plant. The first structure to be erected will be a repair shop 53 x 130 feet, three stories, of reinforced concrete floors and steel frame, to cost about $26,000. The cost of the remainder of the building scheme together with the machinery outlay will be about $750,000.

The American Clay Machinery Co., Willoughby, O., has been awarded the general contract by the Illinois Granite Brick Co. for a brick plant to be built at Michigan City, Ind.

The Marion Steam Shovel Co., Marion, O., advises that the new building which is being added to its plant will house an open-hearth steel department.

INDIANAPOLIS.

Improvement in Business—Cities Offer Bonuses.

Indianapolis, Ind., Sept. 1.—The Capital Machine Works has moved into its new plant at Roosevelt avenue and Rural street, at the edge of Brightwood, a suburb. It is a modern plant consisting of several brick buildings and manufactures a large line of veneer machinery. A small force is employed at present, but within a short time a much larger number will be at work.

Local machinery companies are noting an improvement in market conditions and the majority of them are running full time and have very satisfactory orders ahead. Indiana is enjoying a return of prosperity and there are few cities of importance in the state that are not offering special bonuses or free sites to new factories. As a result, plants manufacturing machinery are having much better business than might be expected at this time.

The Federal Supply Co., which has been operating on a small scale for some time, increased its capital stock to $30,000 last week and incorporated. In the future it will devote its attention largely to manufacturing machinery for the manufacture of a non-refillable paper bottle. Harry E. Dill, William A. Scott and Murat W. Hopkins are directors.

The Classification of Old Material

An Analysis of Prevailing Practices in the Scrap Market, Dealing With the Varied Methods That Are Now in Use

More determined efforts are being made by both producers and consumers to provide greater uniformity in the classification of the various grades of old material. Leading western railroads have inaugurated a movement which has resulted in the adoption by the Railway Storekeeper's Association of standard specifications of the scrap material of which the steam roads are producers. Melters generally are also lending an attentive ear to any suggestion that may result in crystallizing the varying elements of the market into a more specific designation of grades and terms.

It is widely appreciated that, with both buyers and sellers maintaining diverse individual notions in their classifications of the material, this condition is not at all satisfactory. By reason of the many conflicting factors that enter into the old material market, it is also fully realized that any attempt toward a general readjustment would meet with serious obstacles. Particular requirements govern in many cases, making any general rule one of difficulty and of probable hardship to follow at all times. The different sources from which the scrap material is derived and the several uses to which it is put also tend to complicate any effort at standardization. Geographical location is another question that must enter into consideration, since the scrap and consequently the ideas of those who handle it, vary according to the nature of the industries from which it comes, as, for instance, the agricultural scrap in the middle west and the mill scrap in the Pittsburg district.

Division as a Class.

Generally speaking, however, some logical division of old material as a class may be made according to the sources of its production and the ends of its consumption. As to the matter of production, there are three important branches: (1) Railroad scrap coming from the breakage and wear and tear of rail operations. (2) Industrial scrap derived from manufacturing odds and ends, replacements, and the natural deterioration of equipment in mills and factories. (3) Yard or country scrap which is collected by the yard dealer from the less important and the more out of the way sources of supply, such as the home, the farm, small shops, etc.

The railroads collect the scrap along their rights of way, and bring it to an assembling point where it is assorted and graded by employes, for the purpose of selling it to consumers or middlemen. The mills which obtain the scrap for consumption in their furnaces classify this material according to their facilities for using it, and the middleman, if he figures in the transaction, usually has his own ideas as to grading. Thus the same material may be subjected to several classifications, varying as to the view point of the possessor, whether a buyer or a seller.

Classified as to Uses.

Regarded as to the uses to which it is put, old material permits of the following summary: (1) In steel mills and steel foundries, where it is consumed in acid and basic open-hearth furnaces. (2) In iron mills, where it goes to the puddling, busheling and heating furnaces and the forges, and in the iron foundries for melting in cupolas. (3) In re-rolling mills. In these respective melting operations, basic, Bessemer, low-phosphorus, forge and foundry pig iron is mixed in varying proportions with the scrap to make metal mixtures.

From the open-hearth furnaces, the old material comes as steel, is molded into ingots and rolled into finished or semi-finished steel products for the market, or goes into steel castings. From the furnaces of the iron mill or the cupola of the iron foundry, the metal finds its way into bar iron and rolled iron products or into iron castings. The re-rolling mills take re-rolling stock, principally re-rolling rails, and roll them down to lighter products, such as light rails, bars, bedstead angles, small shapes, etc.

The various operations in which old material figures of necessity require the use of different grades of material. These dissimilar needs may be shown by an analysis of the entire field of consumption as follows:

(1) Steel Mills and Steel Foundries.

Acid open-hearth furnace—low phosphorus scrap.

Basic open-hearth furnace—heavy melting steel, bundled sheet scrap, turnings, borings, agricultural steel, cast scrap, old car wheels.

(2) Iron Mills.

Puddling and busheling furnaces—cast scrap, stove plate, grate bars, busheling, borings and turnings, boiler iron cut in sheets and rings, iron pipe and flues.

Bar mills—No. 1 railroad wrought, No. 1 forge wrought, iron axles, cut bridge iron, No. 2 wrought, iron rails, country wrought, horseshoes.

Forges—No. 1 wrought, wrought iron shop scrap, iron axles, heavy shafting.

(3) Iron Foundries.

Cupola—Driving wheel and cylinder scrap, No. 1 machinery, stove plate, grate bars, No. 2 cast, broken car wheels.

(4) Malleable Foundries.

Malleable scrap and steel in limited quantities.

(5) Rerolling Steel Mills.

Rerolling rails, 56 pounds and heavier, free from frogs, switches and guards, and of badly bent rails.

(6) Sheet Bar Mills.

Sheet bar crop ends, steel piling, mashed pipe.

The methods employed by the iron and steel mills and foundries to insure obtaining the proper material for their uses vary considerably. Some companies, as the Carnegie Steel Co., adopt a very rigid set of inspection rules, making each transaction a law in itself, and summarily rejecting shipments which do not strictly conform to this standard. Most companies, however, have drawn up formal specifications of their own, based upon their past experience, and place these before dealers to be followed. In these specifications the diversity in the ideas of melters, as to the different grades, is well illustrated. Other companies make up particular specifications for their needs whenever they are ready to make a purchase.

Some of the leading and most complete specifications now in use by consumers, are herewith reproduced. Of these lists, those of the Republic Iron & Steel Co. apply to iron scrap for rolling mills; of the Interstate Iron & Steel Co., to both iron and steel scrap for rolling mills; of Follansbee

Bros., the American Rolling Mill Co. and the Lukens Iron & Steel Co., to open-hearth practice for rolling operations, and of the American Steel Foundries, to open-hearth practice for steel castings. The classification of the Baltimore & Ohio railroad is also given.

Copies of a standard classification of railroad scrap adopted by the Railway Storekeeper's Association at its meeting in Chicago have been circulated among the trade and are now in effect. The need of such a classification of old material grew out of the lack of uniformity in the negotiations between the railroads, the dealers and the consumers. This was particularly true between the railroads and the middlemen, as the consumers invariably require that their own specifications be followed to the letter. In case of rejection by the mills of shipment from the dealers because the scrap was not of what they regarded as single quality, the latter have recourse to the railroads when the material came from this source. The adoption of a standard classification is aimed to unify the practice between the railroads and the dealers in this respect. The proposed standard classification published in the issue of THE IRON TRADE REVIEW of May 21, preceding the meeting of the association, was rearranged and condensed slightly upon final action, and the official classification now in use is as follows:

Railway Storekeepers' Association.

Arch Bars and Transoms, Iron.
Arch Bars and Transoms, Steel.
Axles, Iron:—Driving and other axles, 6 in. diameter and over.
Axles, Steel:—Driving and other axles, 6 in. diameter and over.
Axles, Iron:—Car, tender, engine truck and other axles, car and locomotive, under 6 in. diameter.
Axles, Steel:—Car, tender, engine truck and other axles, car and locomotive, under 6 in. diameter.
Angle Bars, Splices and Fish Plates, Iron:—For patented joints see No. 36.
Angle Bars, Splices and Fish Plates, Steel:—For patented joints see No. 36.
Brake Beams, Uncut.—All metal brake beams.
Bolsters, Uncut (except Cast Steel):—To include all metal built up type body and truck bolsters.
Boilers, Uncut.—Locomotive and stationary boilers, locomotive tanks, other heavy oil tanks, fire boxes without flues or trimmings, but including mud rings.
Boilers, Cut Up:—Locomotive and stationary boilers, locomotive tanks, other heavy oil tanks, fire boxes without flues or trimmings, but including mud rings, cut in sheets and rings.
No. 1 Busheling:—Iron and soft steel pipes and flues (free from scales); tank and bands No. 12 and heavier, boiler plate punchings and clippings, and soft steel and iron drop forgings and trimmings; nothing to be over 8 in. long or wide, free from galvanized or tinned stock.
No. 2 Busheling:—Cut hoops, sheet, cotton ties and similar light material; nothing to be over 8 in. long or wide; bundled wire and bundled sheet suitable for busheling without further preparation; bundles not to weigh over 40 pounds and not to be over 15 inches in height, width or length; all free from hard steel, cast and malleable and galvanized or tinned stock.
No. 1 Railroad Cast:—Pieces weighing 150 pounds or less includes new grates, new stove plate, clean cast iron culvert, soil and water pipe; free from burnt grates, burnt stove plate and brake shoes.
No. 1A Railroad Cast:—Cylinders and wheel centers.
No. 2 Railroad Cast:—Pieces weighing over 150 pounds; can include new grates and new stove plate; free from burnt grates, burnt stove plate; also exclusive of cylinders and wheel centers.
No. 3 Railroad Cast:—All kinds of burnt castings, including grate bars, grate frames, stove plate, hand car and truck wheels with wrought iron spokes.
Cast Iron Borings:—Clean and free from other metals, dirt and lumps.
Chain, Iron:—All sizes, regardless of length. (May be included in No. 1 Railroad Wrought.)
Chain, Steel.—All sizes, regardless of length.
Channels, Iron:—Car truck, cut apart.
Channels, Iron.—Car truck, uncut.
Channels, Steel:—Car truck, cut apart.
Channels, Steel:—Car truck, uncut.
Steel Couplers and Knuckles:—Cast steel couplers, knuckles and coupler heads.
Frogs and Switch Points, Uncut:—50-pound section and over.
Drillings and Oily Chips:—Wrought iron and soft steel.
Flues and Pipes:—Flues and pipes, boiler flues, wrought iron and steel pipe, regardless of lengths without removing scrap fittings, such as couplings, elbows, tees, etc.
Limed Iron and Steel:—All kinds (except flues) from the interior of boilers, which are incrusted with lime or corroded by the action of water, such as Crown Bars, Crown Bar Bolts, Staybolts, etc.
*No. 1 Structural and Shaped Iron, Cut Up:—Channels (except car truck channels, see item 22), angles, tees, "I" beams, girders and columns, except cast.
*No. 2 Structural and Shaped Iron, Uncut:—Channels (except car truck channels, see item 23), angles, tees, "I" beams, girders and columns, except cast.
*No. 1 Structural and Shaped Steel, Cut Up.—Channels (except car truck channels, see item 24), angles, tees, "I" beams, girders and columns, except cast.
*No. 2 Structural and Shaped Steel, Uncut:—Channels (except car truck channels, see item 25), angles, tees, "I" beams, girders and columns, except cast.
*Structural and Shaped Iron and Steel Mixed, Uncut.—Channels (except car truck), angles, tees, "I" beams, girders and columns, except cast.
*Structural covers building and bridge iron and steel. Shaped covers car and pile driver iron and steel.
Rail Joints:—All patented joints.
Malleable:—All malleable castings.
No. 1 Iron Rail:—5 feet and over, 50 pounds and over standard T section, free from frog, switch and guard rails and bent and crooked rails.
No. 2 Iron Rail:—Cropped rail ends, 3 feet and under.
No. 3 Iron Rail:—3 feet long and under 5 feet, 50 pounds and over standard T section; also bent and crooked rails.
No. 4 Iron Rail:—Frog, switch and guard rails.
No. 1 Steel Rail:—5 feet long and over, 50 pounds and over standard section, free from frog, switch, guard, bent, curved and circle rails.
No. 2 Steel Rail:—Cropped rail ends under 3 feet long; 50 pounds section and over.
No. 3 Steel Rail:—3 feet long and over and under 5 feet, 50 pounds and over, split heads and worn flanges, curved and bent rails, free from frog, switch and guard rails.
No. 4 Steel Rail.—All sections of rail not coming under specifications of Nos. 1, 2 or 3 rail, including frogs, cut apart, guard rails and switch points. Does not include frog fillers or plates.
No. 1 Light Sheet:—Under ¼ inch, consisting of cut smoke stacks, netting, wire rope (not galvanized), hoops, band iron and steel, pressed steel hand car wheels, scoops, shovels, iron wire, free from galvanized iron and tin. Exclusive of material coming under classification of "Busheling."
No. 2 Light Sheet.—Galvanized iron and tin, galvanized rope, roofing, tinware, etc.
Heavy Sheet:—¼ inch and over, including tank, boiler and fire box steel and iron, cut up, bridge plates, frog and crossing plates.
No. 2 Brake Shoes:—Miscellaneous, including all shoes with steel back or with steel or Exclusive of material coming under classification of "Busheling."
No. 1 Brake Shoes:—Plain gray iron.
wrought iron insert, both driving and car.
No. 1 Spring Steel:—Flat; includes all pieces of flat spring steel, old or broken leaf or elliptic springs, from which the bands and bolts have been removed.
No. 2 Spring Steel:—All coil springs made from steel 3/16 inch and over in any diameter.
No. 3 Spring Steel:—Coil springs made from steel under 3/16 inch any diameter.
No. 1 Cast Steel:—Charging box size, 5 feet and under, under 18 inches wide; no piece weighing less than 10 pounds to be included.
No. 2 Cast Steel:—Over 5 feet long and 18 inches wide.
No. 1 Heavy Melting Steel:—Charging box size, 5 feet and under, under 18 inches wide; no piece weighing less than 10 pounds, including all steel scrap not otherwise specified.
No. 2 Heavy Melting Steel.—Over 5 feet long and 18 inches wide; including all steel scrap not otherwise specified.
Tools and Tool Steel:—Files and worn out steel tools, including old claw bars, pinch bars, spike mauls, track wrenches, picks, adzes, axes, chisels, drills, hammers, knuckle pins, punches, tool steel, finger pins, bits, draft keys, bar steel, weighing under 10 pounds per piece.
No. 1 Tires.—All locomotive driving, engine truck and coach tires 36 inches and over inside diameter, smooth inside; not grooved for retaining rings.
No. 2 Tires:—All tires not included in No. 1.
No. 1 Turnings and Drillings:—Wrought iron and soft steel, clean and free from cast borings, brass, hard steel, other metals, dirt and lumps.
No. 2 Turnings and Drillings:—From tires and other similar steel, including hard steel; clean, free from other metals, dirt and lumps.
No. 1 Turnings, Drillings and Borings:—Wrought, cast and steel mixed; free from other metals, dirt and lumps.
No. 2 Turnings, Drillings and Borings:—Wrought, cast and steel mixed with brass and other metals; free from dirt and lumps.
Extra No. 1 Railroad Wrought:—Rods and bars 1½ inches in diameter and larger; 6 feet and over.
No. 1 Railroad Wrought:—Clean wrought iron, from railroad equipment, pieces measuring 4 inches long and over (exclusive of threads) may include rods and bolts ¾ inch in diameter and over (except track bolts); also drawbar yokes, bridge iron in bars or rods, switch rods, heavy iron chain, links and pins; free from riveted material.
No. 2 Railroad Wrought:—All wrought iron under 6 inches long not specified under No. 1; to include track spikes, bolts and nuts, rivets and lag screws.

MISCELLANEOUS.

Babbitt:—Clean.
Barrels, Oil.—Standard classification.
Barrels, Paint:—Standard classification.
Bags and Burlap:—Bagging, sacking and waste covering.
Brick:—Arch and fire brick.
Belting, Leather:—Including punchings and trimmings (specify width).
No. 1 Brass:—Locomotive brass, including rod brass.
No. 2 Brass:—Steam metal brass, including valve fittings.
No. 3 Brass:—Car journal bearings, free from babbitt.
No. 4 Brass:—Brass borings, drillings and turnings.
No. 5 Brass.—Yellow brass castings, including hose couplings, etc.
No. 6 Brass:—Coach trimmings and light brass.
No. 1 Copper:—Wire, flue ferrules, pipe, hammer heads.
No. 2 Copper.—Sheet Copper.
No. 3 Copper:—Roofing copper with paint and nails.
No 4 Copper:—Battery copper, dross and oxide. (Report separately.)
Carpet, Linoleum and Plush. (Specify kind.)
Crucibles, Old.
No. 1 Hose:—Air brake and signal hose free from wire and fittings, also rubber boots and shoes without leather soles.
No. 2 Hose:—Steam and water hose, free from wire and fittings.
No. 3 Hose:—Engine tank, washout, fire and

rubber lined fire hose, free from wire and fittings.
No. 4 Hose, Wire Wound, Hose and Wire Inserted:—To also include oil and paint hose.
Rope:—Manila fiber, not including tar rope.
Tarred Rope and Marlin.
No. 1 Rubber:—Rubber packing, gaskets, diaphragms, matting and step treads.
No. 2 Rubber:—Rubber valves of all kinds.
No. 3 Rubber:—Rubber belting of all kinds.
No. 1 Wheels.—Cast iron, including car, tender and engine truck; no allowance for grease and dirt.
No. 2 Wheels:—Steel tired; specify kind.
Wire, Telegraph in Rolls.
Zinc, Sheet and Battery.

For Iron Mills.

The Republic Iron & Steel Co., the largest single buyer of iron scrap in the United States, uses its classification, which is one of the most complete before the trade, to largely govern its purchases from dealers. The grades iron axles, steel axles, iron rails, steel rails, No. 1 and No. 2 railroad wrought, axle turnings, turnings, drillings, mixed borings and turnings, and cast borings, No. 1 and No. 2 boilers, cut, No. 1 cast and pipes and flues are purchased from the railroads, and the individual classifications of the latter usually apply in these transactions. Accordingly the buyer favors those railroads whose classification more clearly resembles its own The company recently changed the classification of several items in order to more particularly meet the changed conditions brought about by the more extensive use of steel as compared with iron.

All the scrap purchases of the Republic Co. whether large or small, are duly set forth in a legal, binding contract, and signed by all parties interested. On the reverse side of the contract blanks is printed the complete scrap classification, so that the dealer may always be certain of having the specifications under which he sells.

Form of Contract.

The following are the terms of the contract:

Materials are to be delivered f. o. b. cars at ..... Shipments are to begin promptly upon receipt of shipping instructions and are to be made in equal weekly quantities, and to be completed by ....., unless otherwise provided herein. Failure to comply with any condition herein will give buyer the privilege, if expressed in writing to seller, of cancelling at any time during the period of this contract, any unfilled tonnage; or to buy for the account of seller in open market, any unfilled tonnage, charging seller whatever loss may result in so doing. If, on account of strikes, fires, accidents or other contingencies beyond control of buyer, buyer is unable to receive the materials purchased under this contract, it is agreed that these deliveries may be deferred for a reasonable time at the option of the buyer until such causes are removed.

Shipments of materials above described are to be made upon specifications and shipping directions to be furnished seller from time to time by buyer, and it shall be optional with buyer to reject any shipments not made in accordance with such specifications and shipping directions. Such rejected shipments shall, at the option of the buyer, be replaced with material of contracted grade within the time limit of this contract.

All materials furnishel under this contract are to be subject to the weights, grading and inspection of any authorized agent of buyer at its works receiving the materials, whether the materials are bought f. o. b. cars at receiving works, or f. o. b. cars at some other point, and the weights, grading and inspection, as determined by said authorized agent, shall be final and binding on both parties hereto.

Where more than one contract exists between the parties hereto, for the same grade of material, it shall be optional with the buyer as to how application of shipments shall be made.

Any excess freight caused by shipments being made in less than minimum carload quantities shall be paid by the seller. Tonnage handled on switching movement shall be loaded to minimum of 6,000 pounds whenever the character of materials so admits.

Original and duplicate invoices, with bills of lading, shall be mailed to purchasing agent of buyer at ..... immediately upon each shipment of material. Cars will not be unloaded until buyer's works receive said invoices and bills of lading from said purchasing agent's office. Any car service or other expense due to the failure of the seller to deliver said invoices and bills of lading at the time and in the manner above provided, shall be paid by the seller. It is hereby expressly admitted by the seller that the railroad company or companies forwarding the materials are, for the purposes of this contract, the agent or agents of the seller. Buyer shall have the option of receiving or rejecting any car or cars, the delivery of which has been unreasonably delayed, which are offered by the seller or seller's agent at the time when the market price of the material has changed from the contract price of the material due on this contract.

This contract becomes binding only when approved by the purchasing agent of the Republic Iron & Steel Co.

Republic Classification.

The full classification of the company is as follows:

Iron Axles:—Iron Railroad Car Axles, M. C. B. sizes, free from locomotive axles or defective or imperfect forgings.
Steel Axles:—Steel Railroad Car Axles, M. C. B. sizes, free from locomotive axles or defective or imperfect forgings.
Iron Rails:—Standard Section T rails, original weight 50 pounds per yard or heavier, minimum length 5 feet, free from frogs, guards, switches, turntable and curved rails.
Steel Rails:—Standard Section T rails, suitable for re-rolling, original weight 50 pounds per yard or heavier, minimum length 5 feet, free from split heads, frogs, guards, switches, curved and turntable rails.
A No. 1 Railroad Wrought:—Heavy Wrought Iron from railroad shops and cars, 6 inches and longer, including iron links and pins.
B No. 2 Wrought:—Heavy Wrought Iron and Soft Steel Scrap from railroad shops and cars, 2 inches long, 2 inches wide or wider, and longer, including track bolts and nuts, iron angle bars and plain splices, free from patent joints, steel angles and splices, steel channel bars and track spikes.
B—X Track Scrap:—Railroad Bolts, Nuts, Spikes, may include iron angle bars and plain splices.
C—Shafting:—Iron and Soft Steel, 1½ inches to 4 inches round and square; 4 feet and longer, in straight bars.
D—No. 1 Wrought.—Heavy Wrought Iron and Soft Steel fagoting scrap, bars ⅝ inch to 4 inches, round or square; flats ¼ inch thick and heavier, 4 inches long or longer, including wagon axles, horse shoes and wagon tires, exclusive of other shapes or bent pieces.
E—No. 1 Country Wrought:—Heavy Wrought Iron and Soft Steel scrap (the latter not over 0.12 Carbon), including buggy tires, horse shoes; all fagoting scrap.
F—No. 1 Mill:—Iron and Soft Steel bars, not less than ⅜ inch round or square, and flats not thinner than No. 12 wire gage, including heavy railroad sheet; tank in separate sheets and rings, boiler sheet and rings, clean pipes and flues, heavy punchings and clippings and strictly soft steel agricultural implement shapes. All steel must be under 0.12 Carbon.
G—No. 2 Mill:—Iron and Soft Steel hoops and sheets, railroad sheet, cotton tie clippings and ties, skeleton sheet scrap and iron too light for No. 1 mill; scrap shall be free from galvanized, tinned, or badly rusted material.
H—No. 1 Busheling:—Iron and Soft Steel pipes and flues (clean); tank and bands No. 12 and heavier, boiler plate punchings and clippings, and soft steel and iron drop forgings and trimmings; nothing to be over 8 inches long or wide, free from galvanized or tinned stock. All steel must be under 0.12 Carbon.
I—No. 2 Busheling:—Cut hoops, sheet, cotton ties and similar light material; nothing to be over 8 inches long or wide; free from dirt, galvanized or tinned material, or other similar inferior scrap.
J—K—Axles Turnings:—Wrought Iron and Soft Steel railroad car axles, turnings and chips. Free from tire turnings.
L—Turnings:—Machine wrought and soft steel, clean and free from borings and drillings, other metals, dirt and lumps.
M—Drillings:—Wrought or soft steel, clean and free from other metals, dirt and lumps.
N—O—Mixed Borings and Turnings, and Cast Borings:—Clean and free from other metals, dirt and lumps.
P—No. 1 Boilers, Cut.—Boiler sheets and rings, not under 30 inches diameter, all rivets cut. Metal not over ¾ inch thick.
Q—No. 2 Boilers, Cut:—Boiler sheets and rings, under 30 inches in diameter, and riveted flues, not under 16 inches in diameter, all rivets cut. Metal not over ¾ inch thick.
R—Boiler Shop Scrap and Ship Building Shop Scrap:—Wrought and soft steel bar, shape and plate ends, punchings and shearings, free from curly clippings and hard steel.
S—No. 1 Cast:—Machinery and railroad cast, no piece to weigh over 75 pounds.
T—Stove Plate:—Stove plate and railroad locomotive grate bars, free from burnt iron.
U—Bundled Sheet Scrap:—New sheet clippings and shearings, securely bundled; bundles not over 15 inches in height, width or length (may be round or square), and weighing not over 40 pounds each, of uniform solidity, not pressed by machinery.
V—Pipes and Flues:—Wrought and soft steel. Must be free from dirt or lime and from riveted seams.

Wrought and Steel Scrap.

The Interstate Iron & Steel Co., Chicago, has the following standard specifications for wrought and steel scrap:

Iron Axles:—Iron railroad car axles, M. C. B. sizes, free from locomotive axles and defective or imperfect forgings.
Steel Axles:—Steel railroad car axles, M. C. B. sizes, free from locomotive axles and defective or imperfect forgings.
Iron Rails:—Standard section T rails, original weight 50 pounds per yard or heavier, minimum length 4 feet; free from frog, guard, switch, curved and turntable rails.
A No. 1 Railroad Wrought:—Heavy wrought iron from railroad shops and cars, 6 inches and longer, including links and pins.
B No. 2 Railroad Wrought and Track Scrap.—Heavy wrought iron and soft steel scrap from railroad shops and cars, 2 inches and longer, including track bolts, spikes and nuts.
C—Shafting:—Iron and soft steel, 1½ inches to 4 inches round and square; 4 feet and longer in straight bars.
D—No. 1 Wrought:—Heavy wrought iron and soft steel fagoting scrap. Bars ⅝ inch to 4 inches, round or square; flats ¼ inch thick and heavier; 4 inches long or longer, including wagon axles, horse shoes and wagon tires exclusive of other shapes or bent pieces.
E—No. 1 Country Wrought:—Heavy wrought iron and soft steel scrap, including wagon tires and horse shoes; free from cast, malleable, hard steel, hoops, sheet iron, pipes and flues.
F—No. 1 Mill:—Iron and soft steel bars, not less than ⅜ inch round or square, and flats not thinner than No. 12 wire gage, including heavy railroad sheet, tank in separate sheets and rings, boiler sheets and rings, clean pipes and flues, heavy punchings and clippings and strictly soft steel agricultural implement shapes.
G—No. 2 Mill:—Iron and soft steel hoops and sheets; railroad sheet, cotton tie clippings and ties, and iron too light for No. 1 mill; wire rope 10 feet lengths and under; free from galvanized or tinned stock, tangled wire or tangled skeleton sheet scrap.

H—No. 1 Busheling:—Iron and soft steel pipes and flues (clean); tank and bands No. 12 and heavier, boiler plate punchings, and clippings, and soft steel and iron drop forgings and trimmings; nothing to be over 8 inches long or wide, free from galvanized or tinned stock.

I—No. 2 Busheling.—Cut hoops, sheet, cotton ties and similar light material; nothing to be over 8 inches long or wide; bundled wire and bundled sheet suitable for busheling without further preparation; bundles not to weigh over 40 pounds and not to be over 15 inches in height, width or length; all free from hard steel, cast and malleable, and galvanized or tinned stock.

J—K—Axle Turnings:—Wrought iron and soft steel railroad car axle turnings and chips.

L—Turnings:—Machine wrought and soft steel, clean and free from borings and drillings, other metals, dirt and lumps.

M—Drillings:—Wrought or soft steel, clean and free from other metals, dirt and lumps.

N—O—Mixed Borings and Turnings, and Cast Borings:—Clean and free from other metals, dirt and lumps.

P—No. 1 Boilers, Cut.—Boiler sheets and rings not under 30 inches in diameter, all rivets cut.

R—Boiler Shop Scrap and Ship Building Shop Scrap:—Wrought and soft steel bar, shape and plate ends, punchings and shearings, free from curly clippings and hard steel.

S—No. 1 Cast:—Machinery and railroad cast, no piece to weigh over 75 pounds.

T—Stove Plate and Locomotive Grate Bars:—Stove plate and railroad locomotive grate bars, free from burnt iron.

U—Bundled Sheet Scrap:—New sheet clippings and shearings, securely bundled; bundles not over 15 inches in height, width or length (may be round or square), and weighing not over 40 pounds each, of uniform solidity, not pressed by machinery.

V—Pipes and Flues:—Wrought and soft steel. Must be free from dirt or lime and from riveted seams and malleable or cast iron fittings.

INSTRUCTIONS.

Shipments are to begin ..... and are to be completed by ..... excepting, that if on account of strikes, fires, accidents and other contingencies beyond the control of buyer, the buyer is unable to receive the goods purchased under this contract, it is agreed that these deliveries may be deferred for a reasonable time at the option of the buyer until such causes are removed. Furthermore, it shall be optional with the buyer to reject any shipments not made in accordance with the above stipulation.

All the material furnished under this contract is to be subject to weights, grading and inspection of the INTERSTATE IRON & STEEL CO., at their works, and their reports upon same duly verified, shall be final and binding. Furthermore, should any material be rejected, the same shall be replaced with an equal amount of material of the contracted grade, within the time limit of this contract, at the option of the buyer.

When more than one contract exists for the same grade of material, it shall be optional with buyer as to how applications of shipments shall be made.

Any excess freight caused by shipments being made in less than minimum carload quantities shall be paid by seller.

Original and duplicate invoices to be mailed to Interstate Iron & Steel Co., Chicago, immediately upon shipment of material. Cars will not be unloaded until buyer's works receive said invoices from Chicago office. Failure, therefore, to render such documents in accordance with the above instructions, resulting in car service or other expense, shall be paid by seller.

This contract is subject to the printed classification and only becomes binding when accepted by buyer and returned to Interstate Iron & Steel Co. within five days from date of contract.

Open-Hearth Mill Grading.

Follansbee Bros. Co., Pittsburg, manufacturer of sheets, tin plate and hammered open-hearth material, has recently put in force its own scrap specifications, based upon its line of experience. The charging box size is given from 20 to 60 inches. The specifications are as follows:

CLASSIFICATION "A."

No. 1—Cast Iron:—Machinery parts, floor plates, No. 1 railroad or any clean unburnt iron castings. All items minimum weight 10 pounds, maximum 300 pounds.

No. 2—Car Wheels.—All cast iron only. (This item must be loaded in box cars.)

No. 3—Cast Iron Borings:—Clean and free from dirt, sand and other metal such as brass, copper, etc., not rusty or lumpy.

CLASSIFICATION "B."

No. 1—Heavy Melting Steel Strictly No. 1:—Railroad steel, drilling stems, bits and jars, guide mill rolls, boiler plate ¼ inch and thicker, heavy crop ends, structural material, mashed pipe, plate shearings from steel plate ¼ inch and thicker, not needle scrap. All items minimum weight 10 pounds, maximum 300 pounds.

No. 2—Malleable Iron:—Car couplers, car heads, car knucklers, or any clean railroad malleable castings. All items minimum weight 10 pounds, maximum 300 pounds.

No. 3—Pipe Scrap.—New unmashed pipe ends, 4 inches and under in diameter.

No. 4—Shoveling Scrap:—Heavy punchings, small crop ends from shafting, etc., horse shoes, bolts, bolt ends and all good *heavy* clean shoveling scrap; no light, tangled or badly rusted scrap to be included.

CLASSIFICATION "C."

No. 1—Axle Turnings:—Turnings from steel axles. Clean and free from dirt, sand and other metals, not rusty or lumpy.

No. 2—Sheet Scrap:—Ends and sides from sheet and tin mills, well bundled, securely wired and not to exceed 125 pounds to bundle.

INSTRUCTIONS.

All shipments except car wheels must be made in *low side* flat bottom gondola cars.

Shipments must be at the rate specified by us. Excess shipments will be held on cars and the demurrage charged to the shipper.

Written notices of shipment of every car must be mailed on the day of shipment from point of shipment to our address, Follansbee, W. Va., and Pittsburg, Pa. Such notices must state definitely order number, the *classification and title* against which the material is shipped, give the car number and the gross tare and net weights. Cars for which notices have not been received will not be unloaded, and any demurrage charges resulting will be charged to the shipper.

Lukens Iron & Steel Co.

The Lukens Iron & Steel Co., Coatesville, Pa., manufacturer of steel plates, has its own specifications for open-hearth melting scrap. This classification is not followed exclusively by the company by reason of the varied shapes and descriptions of scrap material, but is used as a basis for making contracts, derived from an extended practice. The class specifications of the company for open-hearth melting scrap are as follows:

No. 1—Heavy Steel Scrap, Long:—Straight rails over 5 feet, frog, switch and guard rails, cut apart; straight structural up to 12 inches wide and over 5 feet long, cut apart; straight bars and axles from 1 inch diameter to 4 inches.

No. 1—Heavy Steel Scrap, Short:—Heavy railroad steel in charging box shape, rail, bloom, billet and structural crops under 5 feet in length and 500-pound weight, flat boiler plate ¼ inch and heavier, cut in charging box sizes, not over 20 inches wide and 5 feet long, structural material, straight, not over 5 feet long.

No. 2—Steel Scrap:—Cut yard scrap ¼ inch thick and heavier, all charging box shape, heavy punchings, skate scrap and all good heavy clean shoveling scrap; no light, tangled or badly rusted scrap included.

No. 3—Steel Scrap:—Bundled sheets in compressed packages, light shoveling, bundled skeleton.

No. 4—Steel Scrap.—Frogs and switches not cut apart, structural material not cut, flat boiler plate not cut, and other material of similar shape.

NOTES.

Note No. 1:—No mixed cars of scrap (that is, long and short), will be received except by special agreement in writing.

Note No. 2:—Where short scrap and shoveling are in same car, the shoveling must be in one end or bottom of car; if on top, will be sufficient cause for rejection.

Note No. 3:—Heavy turnings, malleable railroad, detinned billets, car wheels, both iron and steel, cast iron scrap, all are special and not within any above classification.

INSTRUCTIONS.

First.—Shipments must be made in flat bottom gondola or box cars.

Second:—Shipments must be made at the rate specified by us. Excess shipments will be held on cars and the demurrage charged to the shipper.

Third:—All advance charged (regular freight charges excepted), must be paid by shipper before cars will be accepted.

Fourth:—Written notice of the shipment of every car must be mailed on day of shipment from point of shipment to this company. Such notices must give the car number, and the gross, tare and net weights should be mentioned if possible. Cars for which notices have not been received *will not be unloaded*, and any demurrage charges resulting will be charged to shipper.

American Rolling Mill Co.

The American Rolling Mill Co., Middletown, O., maker of basic open-hearth steel, has arranged the following classification of the old material it is called upon to purchase for its operations:

Class A—Country Mixed Steel Scrap, to consist of all steel parts of agricultural implements, wagons, buggies, and clippings ⅛ inch thick and heavier, not to exceed 15 per cent malleable, and to be in strictly charging box size.

Class B—Mixed Steel, Malleable and Breakage Scrap, to be country scrap, free from sheet iron, old wire of any description, stoves or parts of stoves of any kind, boilers or parts of boilers, unless in charging box size or any other heavy material that is over 6 feet in length and 3 inches in diameter and not to exceed over 25 per cent of breakage, which has to be sheared to charging box size.

Class C—Bundled Sheet Steel Scrap, to be free of tinned, galvanized and painted stock, to be new sheet scrap in compact bundles, not to exceed 16 x 22 x 58 inches in size, and no bundle to weigh less than 60 pounds.

Class D—Iron and Steel Turnings, to be of heavy axle or rail turnings, which can be easily shoveled and to be free of light stringy turnings that have to be forked; also to be free of cast borings and other foreign materials.

Class E—Cast Iron Borings, to be clean and free from dirt, rusty and lumpy borings and all other foreign materials.

Class F—Annealing Pots, to be reasonably free from scale and all gas retorts.

INSTRUCTIONS.

Material is purchased subject to our weight, grading and approval.

Material purchased subject to classification.

This order is given and accepted with the understanding that if any of the material is not delivered as herein provided, the buyer may, on notice to the seller, either decline or receive such undelivered tonnage or buy an equal tonnage on the open market and charge the seller with the excess cost, if any. Until such notice is given, time of delivery will be considered as extended at pleasure of buyer.

Render separate invoice for each car shipped.

Open-Hearth Foundry Practice.

Somewhat varied specifications for steel scrap are used by the American Steel Foundries for its different plants. These are as follows:

THURLOW, PA., WORKS.

Low Phosphorus Scrap—
One-half each crop ends and heavy straight plate scrap in charging box sizes.
Analysis guaranteed as follows:
Phosphorus ..... 0.035 maximum
Sulphur ..... 0.035 maximum
No piece to weigh less than 15 pounds or over 200 pounds, nor to be over 4 feet long and 15 inches wide.

PITTSBURG, PA., FRANKLIN, PA., SHARON, PA., AND INDIANA HARBOR, IND., WORKS.

Low Phosphorus Scrap—
One-half each crop ends and heavy straight plate scrap guaranteed ¼ inch and heavier. All in charging box sizes, no piece to weigh over 500 pounds, nor to be over 3½ feet long or 18 inches wide.
Analysis guaranteed as follows:
Phosphorus ..... 0.04 maximum
Sulphur ..... 0.04 maximum

ALLIANCE, O., WORKS.

Scrap steel rails and heavy steel railroad scrap, frogs, guards and switch rails cut apart. Girder rails with cast welds, rails with chairs and locomotive tires not accepted. Leaf springs must be whole, not separated or cut apart. No piece to weigh less than 15 pounds, nor to be over 4 feet long or 18 inches wide, excepting rails.

GRANITE CITY, ILL., AND E. ST. LOUIS, ILL., WORKS.

Scrap steel rails and heavy steel railroad scrap, frogs, guards, and switch rails cut apart, girder rails with cast welds not to exceed 10 per cent in any one carload. Leaf springs separated or cut apart and locomotive tires not accepted. No piece excepting rails to be over 4 feet long and 2 feet wide, no rails under 45 pounds per yard accepted unless cut to charging box lengths.

Railroad Classification.

The classification of the Baltimore & Ohio railroad, which is regarded as a typical railroad classification and an especially thorough one, is as follows:

WROUGHT IRON.

No. 1—Bolts, wrought iron crank pins, all blacksmith-shop scrap frog plates, engine frames, when cut up as follows: Pedestals cut off and frames cut up to 6 feet or under.
No. 1a—Arch bars.
No. 2—Spikes, angle bars, nuts, crown bars, wrought iron engine frames when not cut up, wrought iron beams and channels.
No. 3—Light sheet scrap, wire, wire rope and netting, old hoops, hoop iron, hopper, tank and stack iron cut, rail slivers, punching and washers.
No. 4—Wrought iron flues, flue ends and pipe.
No. 5—Mixed wrought iron and steel borings and turnings; CLEAN.
No. 6—Mixed wrought iron and steel borings and turnings; OILY.
No. 6a—Mixed wrought iron and steel borings and turnings; OILY, containing small per cent cast iron and brass.
No. 7—Uncut boiler iron and steel, fire box complete, boiler rings cut from old boilers.
No. 8—Axles, hammered 6 inches diameter and over.
No. 8a—Axles, hammered under 6 inches diameter.
No. 9—Wrought iron bridge scrap (uncut). Uncut bridge scrap, one-half iron, one-half steel.

CAST IRON.

No. 1—Engine, car and other iron castings, not otherwise classified.
No. 1a—Brake shoes, cast iron with either wrought iron or steel inserts or backs.
No. 2—Heavy scrap that needs to be broken up, bridge columns, old frogs, hammer dies, etc.
No. 3—Burnt castings and grate bars.
No. 3a—Burnt castings and grate bars with small per cent wrought iron.
No. 4—Clean cast iron borings and turnings.
No. 4a—Clean cast iron borings and turnings with small per cent brass.
No. 4b—Clean cast iron borings and turnings with small per cent wrought iron.
No. 5—Oily cast iron borings and turnings.
No. 6—Car wheels.
No. 7—Malleable iron castings.

WROUGHT STEEL.

No. 1—Axles, car.
No. 2—Axles, engine, driving.
No. 2a—Axles, engine, truck.
No. 3—Eccentric rods, crank pins, main side and guide rods, coupling pins, ends of axles, etc.

MISCELLANEOUS STEEL.

No. 1—Files and tool steel, taps, dies, drills, reamers, etc.
No. 1a—Steel pipe, flue ends, etc.
No. 2—Elliptic spring with bands.
No. 2a—Elliptic spring from which bands have been removed.
No. 3—Spiral spring.
No. 4—Tires, car or engine truck, with bolt holes, retaining ring groove or shoulder.
No. 4a—Tires, driving, with retaining ring groove or shoulder.
No. 5—Tires, car or engine truck (smooth inside).
No. 5a—Tires, driving (smooth inside).
No. 6—Castings, steel, locomotive and car.
No. 6a—Cast steel bolsters, not broken up.
No. 7—Pressed steel (5 feet long, 18 inches wide and under), to include stake pockets, journal box lids, corner bands, center plates, tie plates, etc.
No. 7a—Pressed steel (over 5 feet long or over 18 inches wide).
No. 7b—Pressed steel, bolsters (uncut).
No. 8—Angle and splice bars (iron and steel).
No. 8a—Continuous rail joints.
No. 9—Plates (not otherwise classified).
No. 10—Steel angles, I-beams and channels, any section, length or weight.
No. 11—Steel locomotive frames with pedestals cut off and frames cut to 6 feet and under.
No. 11a—Steel locomotive frames (uncut).

IRON RAILS.

No. 1—Three feet or over, any section or weight.

STEEL RAILS.

No. 1—All old rail, 6 feet and over, free from frog, switch and wing, any section or weight.
No. 2—All pieces of steel rail, under 6 feet, free from frog, guard and switch pieces, any section or weight.
No. 3—Frog, guard and switch pieces, cut apart, any section or weight.
No. 4—Tram, girder and other street rail, any section, length or weight.

TERMS AND CONDITIONS.

Delivery will be made at any designated point on the tracks of the Baltimore & Ohio.

No bids will be considered which merely states "f. o. b. tracks." Specific points must be named.

When delivery at either of several places is named, it is understood that the Baltimore & Ohio Railroad shall have the right to deliver at either of said places.

It is understood that shipment is to be made at our convenience within 30 days from date of certificate of sale, unless otherwise specified by bidder at time of making bid.

The right is reserved to accept offer for a portion only of the quantity bid for, provided certificate of sale covers not less than a minimum carload.

Certificates of sale will be issued not later than two working days after closing date given above. Bids cannot be withdrawn or reduced between the date fixed for closing and the two days allowed for issuing certificates.

The terms will be strictly sight draft against bill of lading.

HIGHER TARIFF

Not Certain to Develop Mexican Industries—Coal Explorations.

Mexico City, Aug. 23.—While the foreign trade of Mexico has been very light for the past two months, the official figures for 11 months of the fiscal year, from July 1, 1907, show fairly satisfactory trade conditions, considering the general financial depression. The imports for the period amounted to 207,463,492 pesos as against 210,179,976 pesos for the corresponding period of the preceding year. The exports of the 11 months of the fiscal year amount to 222,393,066 pesos as against 228,071,773 pesos for the corresponding prior period. This indicates the balance of trade in favor of Mexico of about 15,000,000 pesos, which in part is offset by large exportation of gold. The products of iron and steel imported for the 11 months period are as follows: Materials for construction and for use in industries, 1907-8, 21,600,989 pesos, 1906-7, 18,020,836 pesos. Iron and steel, manufactured, 1907-8, 6,767,461 pesos, for 1906-7, 6,394,475 pesos.

The new tariff on iron and steel products went into effect on Aug. 15. The intention of the law is to stimulate the manufacture of iron in Mexico, but it is not clear to what extent it will do this. Thus far no special installations are planned to take advantage of the protection afforded by the new law. The chief iron producing plant at Monterey is, however, under full operation and has extensive advance orders on hand. Most of the agents of the American and European steel plants have considerable stocks on hand, and it is generally believed that the American steel producers will continue to meet the price of the local products. The increase on different classes of products, in Mexican currency, is as follows: Screws, clamps, joints and nuts, for rails, 3 cents; beams and joists of steel, per hundred weight gross, $3.50; Vigas, beams of iron and iron volumns, when perforated, per kilo gross, 5 cents; steel bars under article 228, per hundred kilos, gross, $5.50; steel in bars, plain, per kilo, gross weight, 6 cents; worked and adorned steel in bars, gross kilo, gross weight, 7 cents; iron in bars, gross weight, 7 cents; iron and steel rails, per hundred kilos gross, $2.50.

The Cananea, Yaqui River & Pacific railroad, which the Harriman interest is extending down the west coast, has placed an order for 28,000 tons of standard Bessemer rails with the United States Steel Corporation for immediate delivery at Guaymas, Sonora, Mexico. A year ago this same railroad found it necessary to purchase rails from Spain for construction of the West Coast line. The West Coast line is now operating as far as Culiacan, Sinaloa, and the work on the extension to Guadalajara is being pushed.

The Mexican railway commission has been petitioned to increase the rates on imported coal and coke, with a view of stimulating the local industry.

There is apparently an increased activity on the part of the English iron and steel manufacturers to seek trade in Mexico. Several of the important companies are now represented in the field.

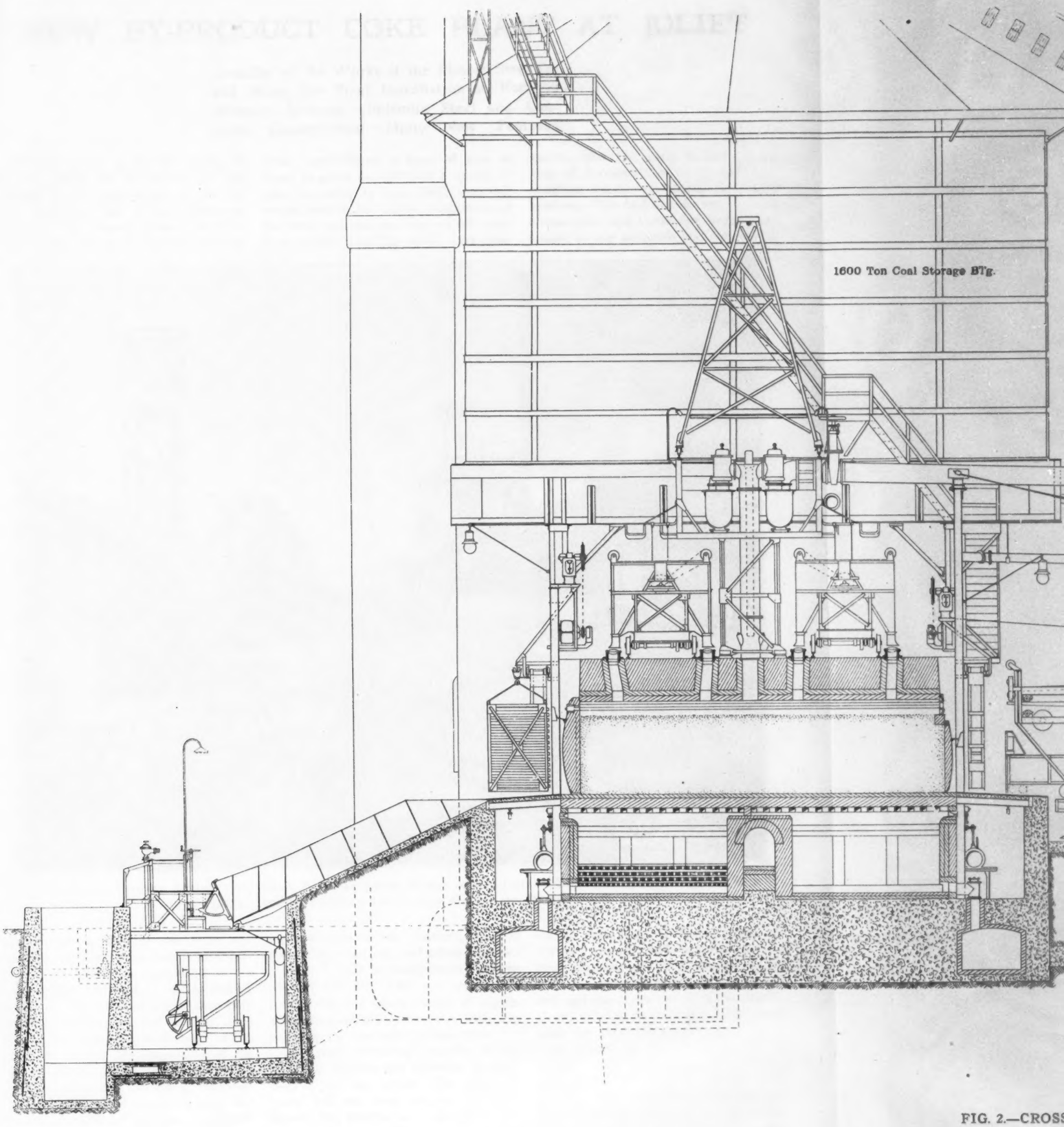


FIG. 2.—CROSS

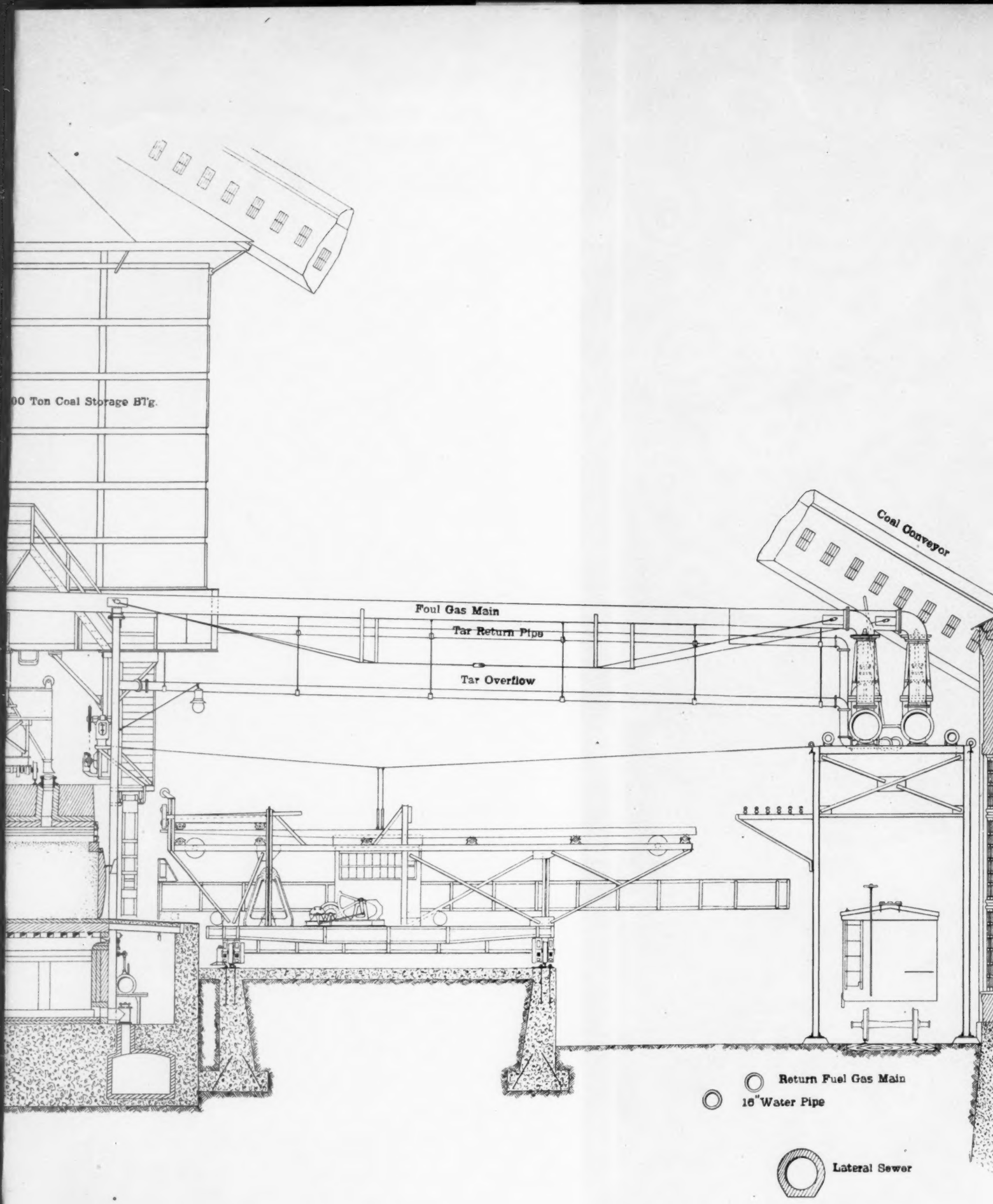
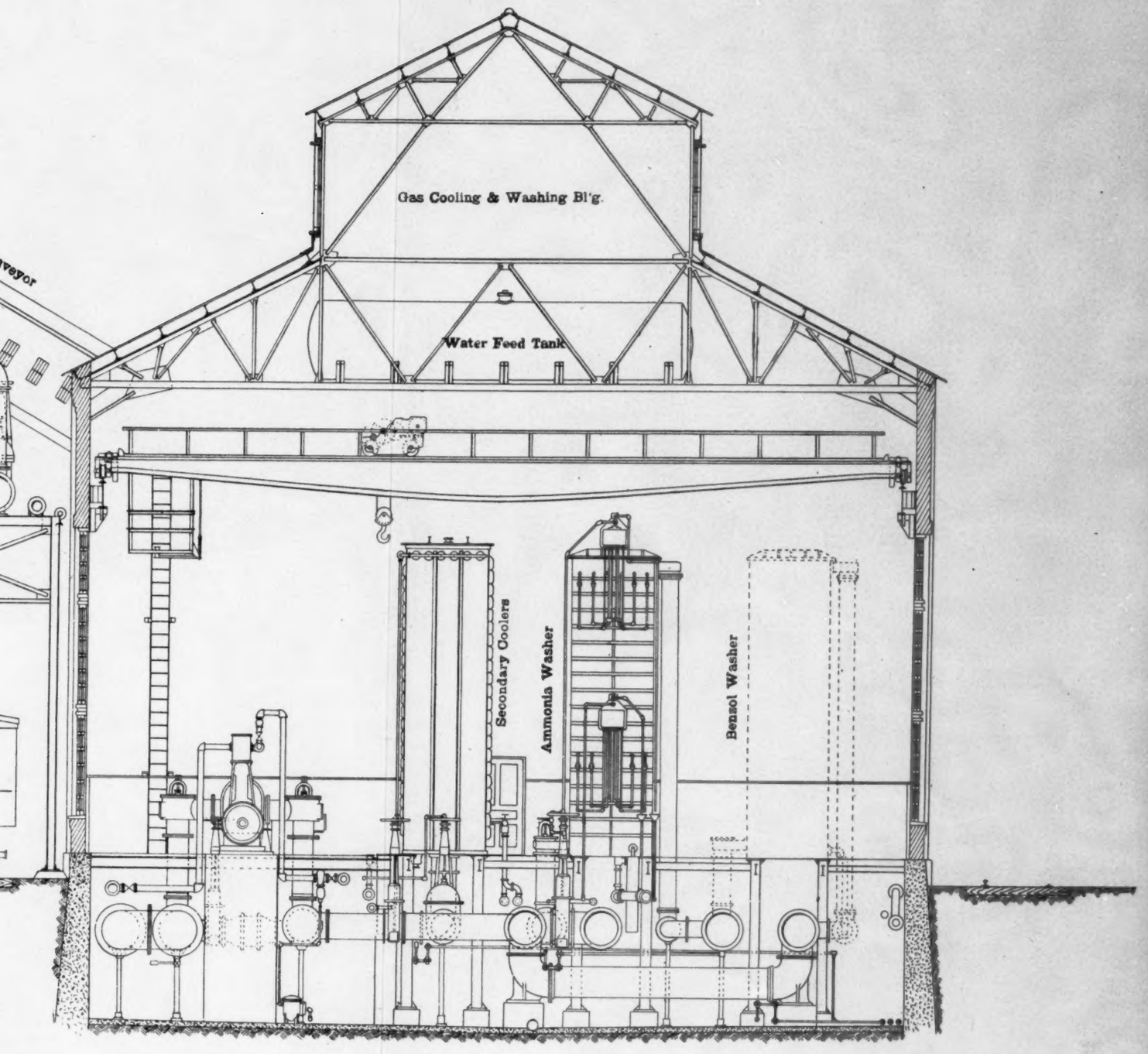


FIG. 2.—CROSS SECTION OF KOPPERS COKE OVEN PLANT AT JOLIET WORKS OF ILLINOIS STEEL CO.


Gas Cooling & Washing Bl'g.
Water Feed Tank
Secondary Coolers
Ammonia Washer
Benzol Washer

NEW BY-PRODUCT COKE PLANT AT JOLIET

Installed at the Works of the Illinois Steel Co. and Being the First Installation of Koppers Ovens in America — Splendid Steel and Concrete Construction — Many New Features

Fire was started in the first battery of Koppers ovens to be erected in this country, at the Joliet works of the Illinois Steel Co., July 27 last. Distinctly unique as the pioneer installation of its type on this side of the Atlantic, this by-product coking plant of 280 ovens and auxiliary distilling apparatus is also notable as an industrial experiment in the development of western steel making plants, as the embodiment of unusually splendid construction and as the exponent of a number of new features of design. In general the magnitude of the plant is indicated by the requirements of its construction, including, approximately, 5,000 tons of structural steel, 40,000 cubic yards of concrete, 10,000,000 refractory brick of special sizes and unusual specifications, a force of men at times as great as 1,500 and a period of time beginning in July, 1907, that will extend before the entire completion of the plant into the last days of this year. It is expected that the actual coke making operations in No. 1 battery, which is now being dried out, and which is shown in Fig. 1, will be inaugurated between Sept. 1 and 15. This will require, of course, that the entire scheme of piping, by-product plant and conveyors shall also be ready for operation by that time.

FIG. 1—GENERAL VIEW OF KOPPERS COKE OVEN PLANT AT JOLIET WORKS OF THE ILLINOIS STEEL CO. FROM THE SOUTH END OF NO. 1 BATTERY, SHOWING THE PUSHER SIDE ON THE RIGHT.

The steel producing capacity of Illinois and Indiana has increased wonderfully in the last decade. The next few years will see even greater advances. Behind this building of large plants, the most striking example of which is the Indiana Steel Co. works at Gary, is the idea of bringing production and consumption together, as applied to finished products. The first instinct was to bring consumption and production together, as applied to raw materials, and we find the coking coal fields of Pennsylvania and Virginia dotted and surrounded with blast furnaces and steel plants. In the west, the quantity of coking coal is limited and the character of the local coke, if not inferior, is at least not yet acceptable for extended consumption.

As against the bee-hive oven, the by-product retort oven is proving itself the solution of the situation in the west, meeting, as it does, the cost of the coal and its own greater cost of installation with the value of its recovered by-pro-

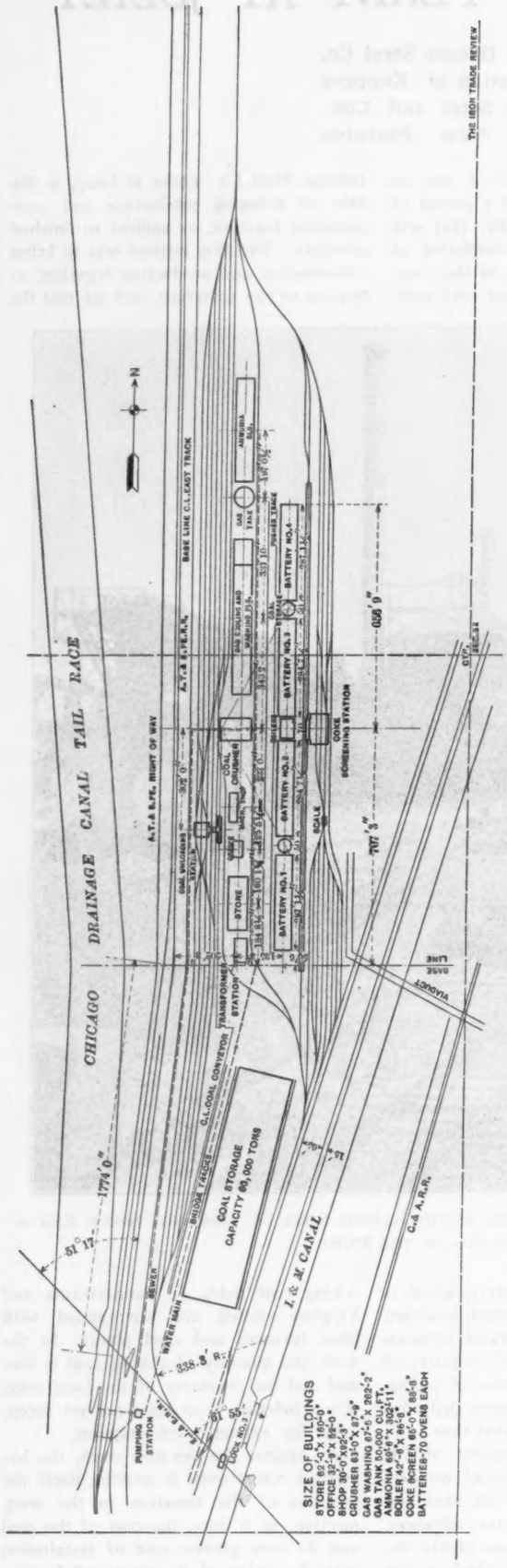


FIG. 3—PLAN OF KOPPERS COKE OVEN PLANT AT JOLIET WORKS OF ILLINOIS STEEL CO.

ducts. The present Koppers plant has a capacity of about 2,240 tons of coke daily or sufficient for the requirements of the Joliet plant of the Illinois Steel Co.

The Koppers oven was developed in Germany at Essen-Ruhr. This development was a part of that general practice and experience which has established the superiority of vertical flues over horizontal flues in obtaining a uniform heating of the ovens, and also established the economy of pre-heating the air for combustion, by means of the regenerator system. In common with other makes of ovens these features are embodied in the Koppers type. Much more was done, however, in the development of the control of the combustion in the heating flues, and in this respect superiority is claimed for the Koppers design. The same arrangement which provides for this accurate and easy control, also permits of a ready inspection of each flue and obviates completely the objections to the vertical flue which have led in some instances to the adoption of the horizontal flue, because of its greater accessibility for inspection. Fig. 5 is a cross section of the oven, showing the dampers and the entrance to them, the arrangement of the flues and the relative location of the air and gas inlets, and the regenerator sets beneath the ovens.

In the latest type of Koppers oven, a new arrangement of the regenerators has been devised to remedy the conditions in the former type, as a result of which a uniform heating of all the oven flues seemed impossible to obtain. Formerly, the regenerators consisted of two long chambers running the entire length of the battery of ovens. Now, however, separate sets of regenerators are provided for each oven. This solves the problem of uniform heating. The substructure construction is simpler and less liable to be affected by the expansion of the brickwork, and each oven is independent of the remainder of the battery. The oven flues are in two sections in the oven walls, so that the gases pass up in one set and down in the other, and when the generators are reversed, the flues cary the gases in opposite directions. The butter-fly valves, which control the reversing of the regenerators, are electrically-operated and timed by a master clock.

The air for combustion flows along passage-ways at the front and back of the ovens beneath the coke bench and pushing engine track and through conduits which lead to the openings into the regenerators, where it is heated to about 1,800 degrees Fahr. From the regenerators the heated air passes up into the flues through a rectangular opening in the side of the flue at the bottom. The purified gas from the by-product plant is returned through mains running the

length of the ovens and thence through distributing channels beneath the oven walls and is delivered to the gas nozzles. These nozzles are on a level with the bottom of the oven, are separate from the air entrance, are oval in shape and can be easily removed from the top of the oven by means of a properly shaped rod. The regulation of the ensuing combustion is accomplished in several ways. The flue passage is continued through an opening up to the top of the oven, where it is fitted with an easily removable hand hole cover. Sliding bricks are placed alongside of the air entrance at the bottom of the flue, and also where the top opening enters the flue. By the insertion of a rod, these bricks can be moved over the apertures, regulating their size to a nicety, and consequently the amount of air admitted. In addition to this, the quantity of air admitted to each oven is regulated by means of flue dampers placed in the passageway on each side of the oven and in the main flue leading to the chimney. The regulation of the gas is effected by a main valve and by cocks fitted into the branch supply pipes which conduct the gas from the main into each oven. The amount of gas admitted into each flue is further regulated by substituting gas nozzles having a larger or smaller inlet hole, as indicated above. Once the regulation is accomplished, there should be no occasion for changing it again.

The oven itself is not of unusual shape. The oven chamber is 35 feet long and of a mean width of 19 inches, having a 4-inch taper from 17 to 21 inches, is 8 feet 9 inches high, and will hold 11 tons of coal. The brickwork of the ovens is decidedly unusual, being made under especially rigid specifications. One feature of the shape of the oven is unusual and is intended to prevent any failure of the oven to coke the ends of the charge. The oven door is hung in a recess, so that the walls on both sides extend out farther than the oven chamber, and as a result the heat is applied even beyond the oven chamber, thus completely coking the coal and leaving no black ends.

The coke plant is located about one mile north of the steel works on the site of an old limestone quarry between the Desplaines river, the Chicago Drainage canal and the Santa Fe railroad on one side, the old Illinois & Michigan canal and the Chicago & Alton R. R. on the other side, and the Elgin, Joliet & Eastern R. R. at one end. The layout of the plan is indicated in the ground plan, Fig. 3, and in the general perspective, Fig. 1. Much of the ground had to be filled and leveled, but the rocky character of the location provided excellent foundations. The filling is still in progress and the views do not show as yet the ground that is to be leveled off for a coal storage pile that will accommodate 60,000 tons and for the gravity railroad yard into which coal cars will be shunted from the main line and from which they will discharge coal for coking. As indicated in the ground plan, the 280 ovens are in four batteries of 70 ovens each, arranged in a row, while the auxiliary and by-product plants are similarly arranged along the opposite side of a mid-

FIG. 4—PANORAMIC VIEW OF LOCATION OF JOLIET COKE PLANT. STEEL MILLS IN THE DISTANCE TO THE SOUTH. DESPLAINES RIVER AND SANITARY DRAINAGE CANAL ON THE RIGHT AND THE OLD ILLINOIS-MICHIGAN CANAL ON THE LEFT.

dle avenue, which extends the length of the plant. The entire plant is electrically operated. The routing of the material involved in coking the coal and recovering the by-products is not essentially different here than at most by-product plants, save as affected by the new features adopted. The bottom dump coal cars from the gravity yard run down over the unloading track hoppers and are discharged, the coal is delivered to an inclined belt conveyor, and is carried to the top of the coal crusher building. Here it passes through Bradford breakers and is discharged over a magnetic separator into hoppers that feed the hammer mills. This magnetic separator has in addition to the usual revolving armatures a second magnetized plate so placed as to attract and hold as they fall magnetic particles that had not been caught in the first separation. The hammer mills pulverize the coal so that 80 per cent will pass through a ⅛-inch mesh. The crusher building provides for handling crushed coal out of the building from both sides, as it may be required for the various batteries of ovens. From the hammer mills the coal is raised by means of a belt and bucket elevator up to two 360-ton bins, one for each of the two kinds of coal used in making this coke. At the bottom of the above bins are mixers and feeders from which the mixed coke is charged onto a belt conveyor that carries the coal up and diagonally across to the top of two coal storage bins, one of which is located between No. 1 and No. 2 batteries, and one between Nos. 3 and 4. Each of these bins will hold 1,600 tons of coal, which is 24 hours supply for two batteries. These bins are novel in that they are circular, which design accomplished a decided saving of construction material and expense, as compared with a square bin. To prevent the arching or "hanging up" of the crushed coal in the hopper bottoms of these bins, the bottoms are lined with ½-inch polished wire glass set in plaster of paris, affording an almost frictionless surface.

From these bins the coal is drawn directly into the charging larries. The

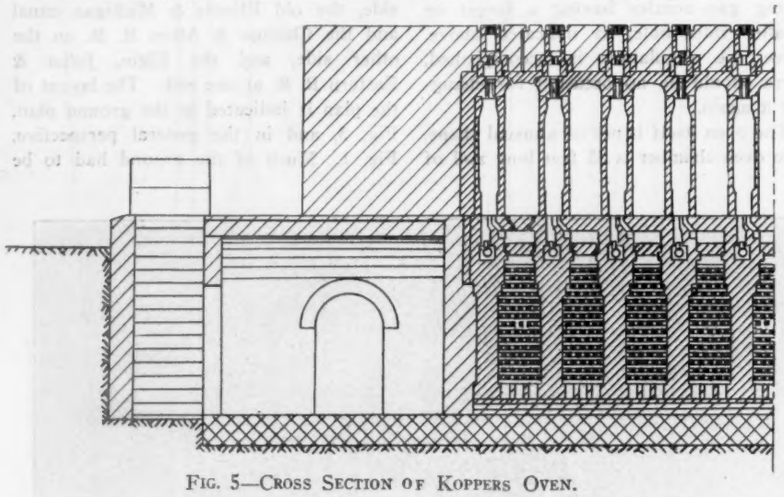


FIG. 5—CROSS SECTION OF KOPPERS OVEN.

design of these larries is shown in the general cross section of the plant. They are electrically-driven from overhead wires and two larries, each with two discharging hoppers and running on parallel track; can feed the ovens through all four charging holes. The tracks are continuous throughout the length of the four batteries, and above the boiler house, which is located between batteries Nos. 2 and 3 is a larry shed in which emergency larries are kept. The larries are equipped with a coal poking device operated by a 5-horsepower motor, which aids in the discharge of the coal from the larry without the customary pounding of the sides.

The leveling of the coke in the oven is done during charging. The coke pusher and leveler to be used is of a new design by John W. Seaver, Cleveland, as described in THE IRON TRADE REVIEW of July 30, 1908. The entire machine is built of steel, and is operated entirely by mill motors. Devices for recording the exact pushing pressures and traverse are provided. The leveling arm is capable of a reciprocating motion, and a device is attached to the machine for raising and lowering the oven doors. The pusher ram is protected from the oven heat by an asbestos timber transite board.

The ovens have several unique features of advantage. Some of these, among them the high ascension or gas discharging pipes, are shown in Figs. 6 and 7. This height of the discharge pipe is characteristic of the Koppers oven, and prevents the escape of heavy pitch so common with many installations. The covers of the charging doors of the oven are self-luting with a ball and socket joint. The main door of the oven on the quenching side is unusually heavy, being of massive casting. It has special clamping devices and the arrangement for raising and lowering consists of a long bar, which runs along the entire length of each battery above the doors. At the end of the battery the bar is in the form of a rack, in which a motor-driven spur gear segment engages, giving to the

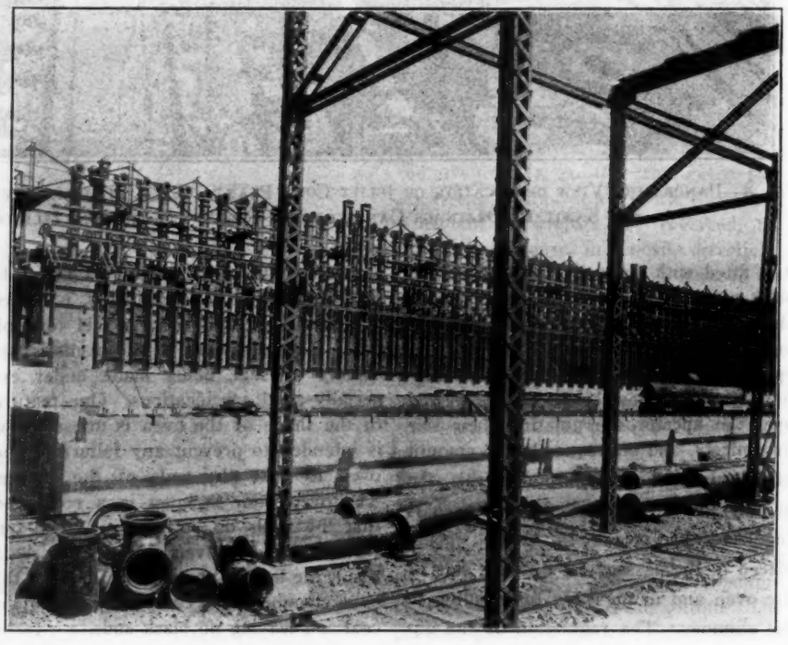


FIG. 6—NO. 1 BATTERY FROM THE PUSHER SIDE.

bar, as required a reciprocating motion sufficient to raise and lower the door, to which connection is made with a hook and cable slung over a pulley. The character of the concrete foundations for the ovens and the coal crusher building is shown in Figs. 8 and 9. These foundations are heavy and very stable. The brick work in the oven construction is shown in Fig. 10, and also the temporary frame structure under which the ovens were built. These structures are bolted throughout, can be taken apart completely and were moved from one battery to the other. This precaution was necessary to protect the brick from the weather.

An oven wall temperature of about 2,500 degrees Fahr. is maintained, and the coking period is 24 hours. With 280 ovens, it is evident that an oven will be pushed every five minutes during each 24 hours. The coked charge is pushed out between guides onto a quenching slope or platform covered with cast iron plates. This platform is large enough to carry 24 hours output of coke and its arrangement is duplicated in but one other plant—an installation of Koppers ovens in Wales. Fig. 11 shows this quenching platform and also the doors or shields, which hold the coke on the incline while it is being quenched. These doors are operated, as indicated, by a pinion and gear segment. The bottom row of plates on the quenching platform is perforated and the water drains through into a trough that delivers the drainage into a sump. Here the coke breeze carried along by the water is separated by gravity.

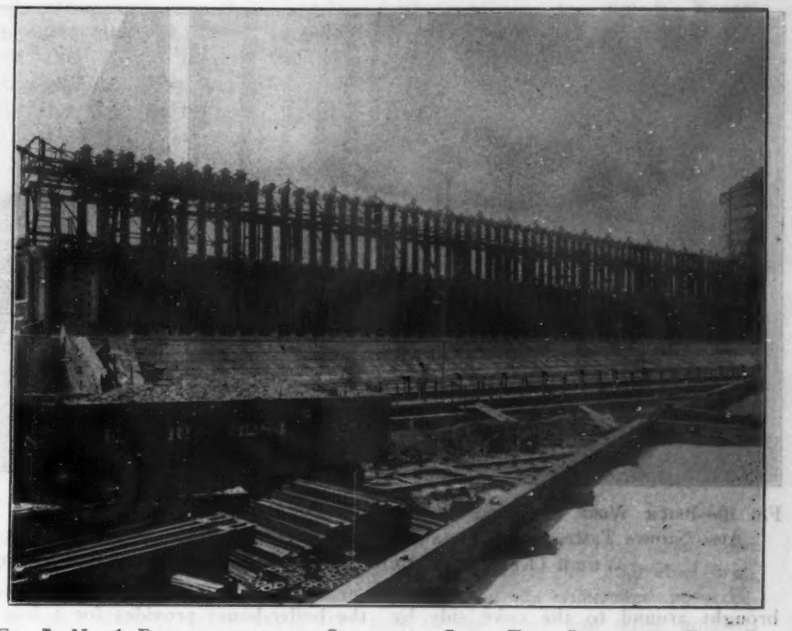


FIG. 7—NO. 1 BATTERY FROM THE QUENCHING SIDE. THIS SHOWS THE TALL GAS OUTLET HEADERS, WHICH ARE UNIQUE FEATURES OF THE KOPPERS OVEN.

As indicated in the general cross section, the quenching platform is paralleled by a tunnel, which is traversed by a coke car operated by an electrically-driven windlass and cable. When the shields are swung down, the coke slides off into this car and is conveyed to a coke elevator, centrally located, with respect to all the ovens. This tunnel is shown in Fig. 12. The coke elevator delivers the coke to three rotary screens, two of which are capable of handling the oven output. The screens are 8 feet in diameter and 35 feet long, are electrically-driven and separate the product into three classes—furnace coke, small coke and coke breeze.

There are two elevators arranged with respect to the three screens, as indicated in the sketch, Fig. 13. The elevators discharge into intermediate bins that are equipped with bottom side gates, through which the coke is fed onto endless slat conveyors. The screens receive the coke from these conveyors and the arrangement is such that any one screen may be idle or either of the elevators. The screens discharge directly into shipping cars, which may be the empty coal cars

FIG. 8—CONCRETE FOUNDATION WORK FOR THE COAL CRUSHER BUILDING. ONE OF THE BY-PRODUCT BUILDINGS IS SHOWN BEYOND.

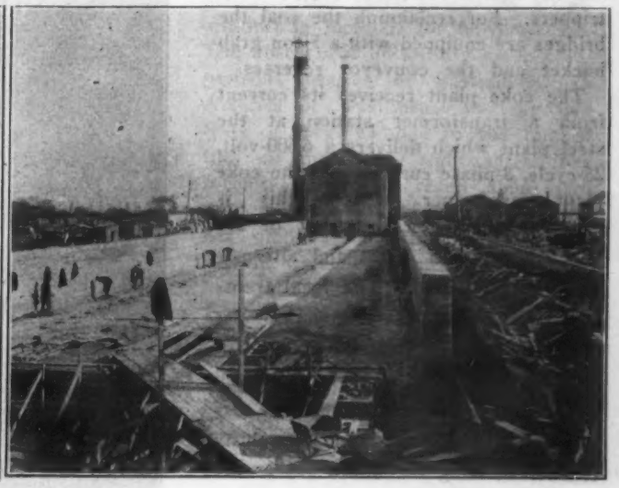


FIG. 9—CONCRETE FOUNDATION WORK FOR NOS. 3 AND 4 BATTERIES.

FIG 10—BRICK WORK OF OVENS IN COURSE OF CONSTRUCTION. ALSO SHOWS TEMPORARY BUILDING STRUCTURE UNDER WHICH OVENS WERE BUILT.

FIG. 11—STEEL PLATE SHIELDS AND OPERATING MECHANISM. THESE DOORS CONTROL THE DUMPING OF COKE FROM THE QUENCHING PLATFORM INTO THE TRANSFER TUNNEL.

brought around to the coke side by gravity.

The coal handling equipment and conveyors will handle coal at the rate of 300 tons an hour, which capacity is designed to be increased to 400 tons. The belt conveyor system is installed and including breakers and crushers the driving motors are operated on an interlocking system. With this device the entire installation is stopped by trouble at any point preventing piling and overflow, and the machinery can be started again at a central station only. A part of the conveying plant not mentioned above is used for carrying coal not intended for immediate use, from the track hoppers to the 60,000-ton storage pile. The pile is spanned by distributing bridges onto which the conveyor runs and the coal is dumped at any point by trippers. For reclaiming the coal the bridges are equipped with a 5-ton grab bucket and the conveyor reverses.

The coke plant receives its current from a transformer station at the steel plant which delivers a 6,600-volt, 25-cycle, 3-phase current. At the coke plant transformer station, this is changed into a local current of 220 and 240 volts on direct and alternating current circuits. The local transformers include a motor-generator set and also stationary transformers. All the machinery of the plant is driven by this current, except the gas exhausters and pumps. In the dusty crusher building the motor rooms are enclosed within brick partitions.

To provide such steam as is needed three water-tube boilers are installed with a capacity of 900-horsepower and the boiler-house provides for a fourth setting. Water for quenching the coke is obtained from the Desplaines river. The pumping plant consists of two alternate, electrically-driven turbine pumps each having a capacity of 3,000,000 gallons per day. This water is first used in the condensers for cooling the gases, whence it goes to a standpipe tank, and from there to the quenching header. The exhaust steam from the gas exhausters and pumps at a pressure of 15 pounds per square inch is used in the ammonia distillation. The boiler plant is heated by waste gas from the ovens obtained from the center burners of each oven. The machine shop, an interior view of which is shown in Fig. 14, is also electrically-driven, and is equipped with all necessary tools.

The coking of 3,000 tons of coal daily provides, approximately, 30,000,000 cubic feet of gas. After the by-products have been recovered about 50 per cent of this is used in heating the ovens. A 50,000 cubic foot gas holder acts as an equalizer on the gas line. In brief, the diagram of the by-product department begins with the flow of heavy gas up through the center ascension pipe to the main header, which carries it direct to the gas cooling and washing house to primary

FIG. 12—COKE TRANSFER TUNNEL PARALLELING THE QUENCHING PLATFORMS.

coolers. From here the gas is drawn into the gas exhausters by blowers, which, in turn, force the gas into the secondary coolers and thence to the ammonia washers. The primary coolers are the ordinary tubular type, but the secondary coolers and bell washers are of special design. The tar is extracted in the coolers and piped to storage tanks for shipment The ammonia water, as received from the ammonia washers is pumped to ammonia stills in a separate building, where it will be made either into concentrated ammonia or ammonium sulphate (NH_4So_4).

The plant has three concrete stacks 8 feet diameter and 200 feet high. One of these is for batteries Nos. 1 and 2, one for batteries Nos. 3 and 4 and one for the boiler plant. The exhaust stack gases have left in them heat corresponding to a temperature of but 450 to 500 degrees Fahr. The gas exhausted to the boilers has a temperature of from 1,200 to 1,500 degrees Fahr.

THE TESTING OF ALLOYS.

At a recent meeting of the Birmingham branch of the British Founddymen's Association, W. B. Parker outlined the methods of testing alloys at the plant of the British Thomson-Houston Co., Ltd. On the subject of testing cast alloys he spoke as follows:

"Cast alloys are sampled by test bars which are either a part of the actual casting or are cast separately. With some alloys it is important to record the casting temperature, and for this purpose a pyrometer is necessary. The methods of preparing the test bars have so important a connection with the results that a reference to a few of these methods will be necessary. Four kinds of molds can be used, namely, green sand, dry sand, loam or chilled molds. Each give different test results, the variations between the elastic limits sometimes amounting to 50 per cent. In ordinary foundry practice either green or dry sand molds should be used and loam or chill molds should not be used unless with the full knowledge of all parties concerned. Some foundries cast the bars in vertical molds and others in a horizontal position, while again the molds are slightly inclined. Most of these conditions influence the results and it is important when making the tests that the exact conditions are noted. Experiments with test bars, 1⅝ inches in diameter and 15 inches long, show that bars cast in dry sand molds by the vertical method give poor results. They frequently fracture at the point of maximum segregation and have a characteristic cup and cone fracture due to the difference in structure of the inner and outer portions of the bar. The horizontal method gives good results, provided the metal is clean. The inclined method usually avoids top side defects. The vertical method gives good results with the majority of alloys, provided the metal is well mixed. Where it is imperative to ascertain the properties of the casting the test bar should be molded on it so that the bar forms an integral part of the casting itself. Test bars intended to form a part of an actual casting should be molded and treated in exactly the same manner as the casting itself."

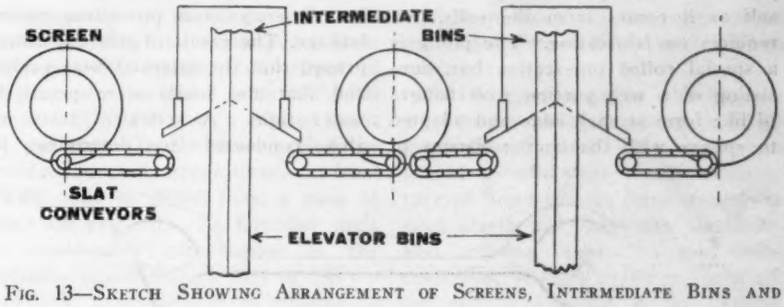


FIG. 13—SKETCH SHOWING ARRANGEMENT OF SCREENS, INTERMEDIATE BINS AND CROSS CONVEYORS.

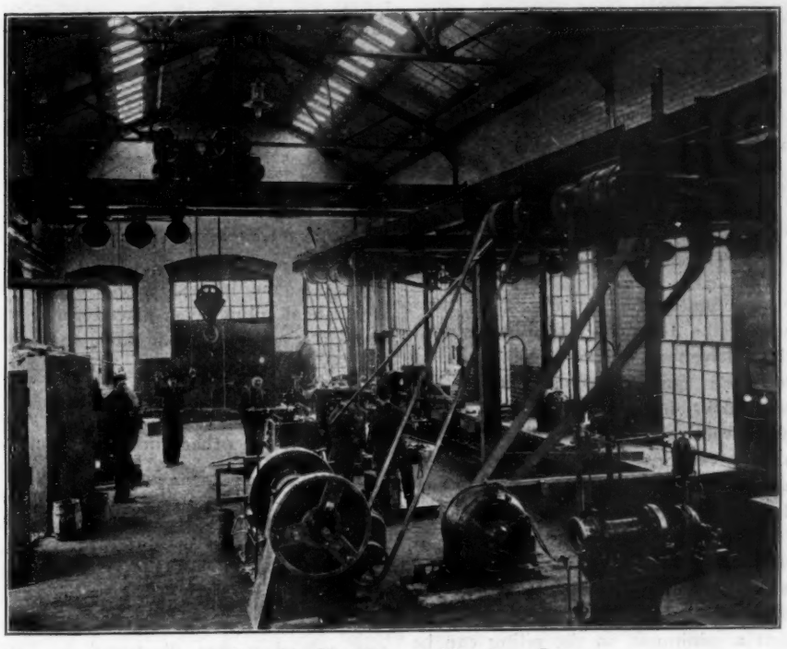


FIG. 14—INTERIOR OF MACHINE SHOP.

Discussion.

Discussing the paper, F. J. Cook said that chills increased the strength of cast iron as much as 84 per cent. Mr. Thomas thought it was most desirable that there should be standard testing methods for universal use. The absence of uniformity made comparisons useless or misleading. In America it was usual to take two tests of forgings, one in the line of the axis and one at right angles. The former showed a result about two tons higher than the latter. He did not quite agree with the summary way in which the English yield point had been dismissed by the lecturer. It would furnish some indication of the elastic limit, and was easier of attainment than the other methods. No one test, he added, would reveal quality and suitability of different metals such as cast iron, bronze, or steel, and a variety of tests were necessary. Nothing had been said about resistance to shock which was an important matter in engineering work.

LACKAWANNA STEEL SHEET PILING

The Lackawanna Steel Co., Buffalo, has recently placed upon the market a new form of steel sheet piling. Each pile is a single piece complete in itself as it comes from the rolls, and requires no fabrication. The piling is a special rolled one-section bar, consisting of a web portion with flanges of like form at each edge and adapted to engage with the similar flanges of an adjacent section. The piling will interlock with the one previously driven.

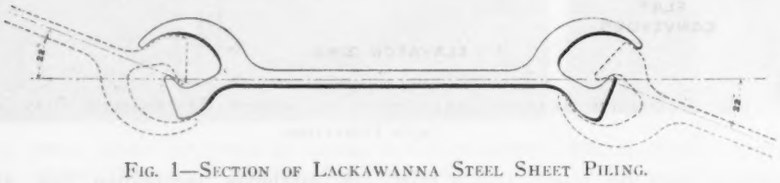


FIG. 1—SECTION OF LACKAWANNA STEEL SHEET PILING.

Fig. 1 represents clearly the form of the piling as rolled. It will be noted that in this piling the flanges on the same side of the webs are similar in design. The shorter flanges are hook shaped and engage with the corresponding hooked flange of the adjacent section. The longer flanges are shaped as shown to form a guard around the hook of the adjacent section. When the piling is driven, the hooked flanges prevent longitudinal displacement while the guard flanges prevent lateral displacement, and assist to prevent longitudinal displacement of the sections. The joint has three points of bearing which produce a close, positive and double interlock, offering in a built up wall a rigid resistance to the strain to which such a wall is subjected, particularly the longitudinal strain, and the side or buckling strains. At the same time, this interlock, with a bearing on both sides of the web, is such as to hold the piling in line while being driven, and to form a straight wall.

The illustration shows the adopted sections. Before placing them on the market, an experimental cofferdam was driven with 32-foot lengths of 12¾-inch sheet piling. The material enclosed was subsequently excavated in order to ascertain the condition of the piling after driving, and to determine its efficiency as a protection against leakage. The result of this experiment proved that the interlock was perfect, and that the joints were practically water tight. A series of tests was also conducted to determine the strength of the interlock, and the average of these tests shows that with two 12¾-inch sections interlocked the joint has in tension a value of 9,700 pounds per linear inch of bar. It is, therefore, a desirable pile for work in which high tension stresses exist. A feature of this bar is the ability to turn various angles and still maintain a perfect interlock, the shape of the interlocking flanges and hooks permitting a change in a direction with a line of piling in case of the encountering of boulders, etc.

A piling of this character and form is specially adapted to the construction of retaining walls, foundations, cofferdams, submarine work, mine shafts, etc., where quicksand and water are encountered. An important feature of the Lackawanna piling is that when driven in ordinary soil, such as clay and quicksand, enough of the soil works into the joints to make them practically water-tight. If driven in clear water, the usual methods of packing, if necessary, may be employed to produce a water-tight joint.

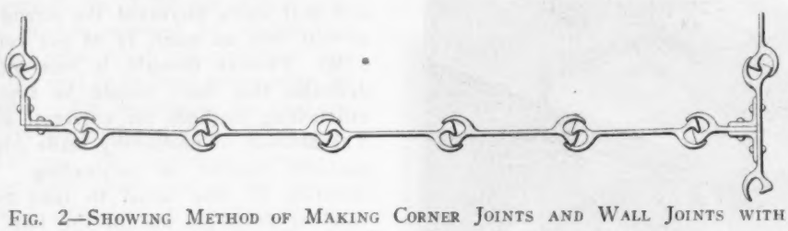


FIG. 2—SHOWING METHOD OF MAKING CORNER JOINTS AND WALL JOINTS WITH LACKAWANNA STEEL SHEET PILING.

On account of its simple form, it has many advantages in handling and driving. The friction area in the interlock, being three narrow surfaces, is at a minimum, so the piling can be easily driven and withdrawn a number of times, and when it has outlived its usefulness, the discarded material can be sold for scrap.

The table below shows the standard weights and widths of sections rolled:

Thickness of web. Inch.	Weight per sq.ft. of wall. Pounds.	Distance C. to C. of joints. Inches.	Weight lin. ft. Pounds.	Width of joint over all. Inches.
½	40.00	12¾	42.500	3 45/64
⅜	35.00	12¾	37.187	3 45/64
¼	19.70	7	11.500	1 53/64

In driving, an ordinary pile driver is used, the head of the piling being fitted with an iron cap having a wooden cushion interposed between the iron cap and the hammer of the pile driver. In driving, satisfactory results have been obtained in keeping the vertical alignment of the bar. This is an important point, especially where a long wall is driven and long lengths are used. In the closing of rectangular pockets, the vertical alignment must be true in order that the closing pile will drive freely for its full length and not strain the interlock.

Fabricated corners are formed by fitting the edges of two half sections at the desired angle by means of structural steel angles. Junction members for cross walls are made up of a full section, a half section and two angles riveted together. Both styles of fabricated corners are shown in Fig. 2.

The 12¾-inch bar has been adopted for the construction of the cofferdam for the new government ship lock in Black Rock Harbor, Niagara river, at Buffalo, N. Y. This lock when completed will be one of the largest ship canal locks in the world. Before selecting the piling to be used in this harbor improvement, a series of tests was made, subject to United States government inspection, in which several makes of piling were driven, and the results obtained from the Lackawanna bar were so satisfactory that the contractors adopted it for this extensive construction.

This is the largest single order of steel sheet piling ever placed for government work, requiring 7,000 tons for the complete cofferdam. This cofferdam is 947 feet long, 245 feet wide outside dimensions at one end and 250 feet at the other end, and requires lengths of 44 feet to 50 feet of piling. The wall of the cofferdam is made of two lines of piling 30 feet apart, with division walls at 30-foot intervals, forming 30-foot pockets. Later these pockets will be filled with clay to form the solid wall of the cofferdam. The test cofferdam was illustrated in THE IRON TRADE REVIEW, May 28, 1908.

FLUORSPAR IN IRON AND STEEL METALLURGY

Rapidly Increasing Use in Steel Plants and Foundries as a Flux — Sources of American Product and Method of Mining — Description of the Fairview Operations

Several years ago, the prediction was made in a geological survey report that a steady increase in the use of fluorspar by the iron and steel industry could be expected. "With the assured supplies in the Kentucky and Illinois districts, which are accessible by water and rail to the large iron and steel centers," said the report, "it is believed that the use of fluorspar in iron metallurgy will show a constant increase in the future." While this prediction has perhaps not been realized to the expected extent and the increase has been only moderate, this is explained in a later government publication by the statement that "in England and on the continent the use of fluorspar is more common than in America, probably because its value has been better understood by European metallurgists."

An interesting comparison can be drawn between the production figures of fluorspar and pig iron in the years since the former has had a general consumption in the iron and steel trade. During the eight years from 1900 to 1907, the pig iron output of this country increased from 13,790,000 tons to 25,780,000 tons, a gain of about 81 per cent. In the same period the production of fluorspar increased from 18,450 tons to 49,486 tons, a gain of over 168 per cent. As fluorspar finds a considerable consumption in the manufacture of glass, a part of this remarkable increase must be credited to that industry, but it is only fair to attribute it principally to a more general use in iron and steel manufacture, government statistics showing that fully 80 per cent of the total fluorspar consumption is in this field, chiefly in the form of open-hearth charges.

In iron and steel metallurgy, the uses of fluorspar are extensive. In the manufacture of steel, it is employed because of the great fluidity which it gives to the slag in open-hearth work. It is mainly used in connection with the basic processes. For these purposes, fluorspar should not contain more than 3 to 4 per cent silica.

Further in connection with its uses, we take the following from a recent government report: "Fluorspar is employed to advantage in the manufacture of ferro-silicon, ferro-manganese, open-hearth and Bessemer steels and also ordinary irons. An iron alloy containing as high as 10 per cent silicon can be obtained in the ordinary blast furnace from a silicious iron ore, if it be fluxed with fluorspar. The fluorspar energetically reduces the silica, or rather unites with it to form fluor-silicon, which is reduced to silicon by the hydrogen contained in the furnace gases and probably, also, by the coke. Similarly, in the manufacture of iron manganese alloys the use of fluorspar is an advantage, and in the manufacture of ferro-manganese it is absolutely necessary." There is ample evidence that it possesses a considerably higher quantitative efficiency

FIG. 1—VIEW OF WORKINGS AT THE FAIRVIEW FLUORSPAR WORKS.

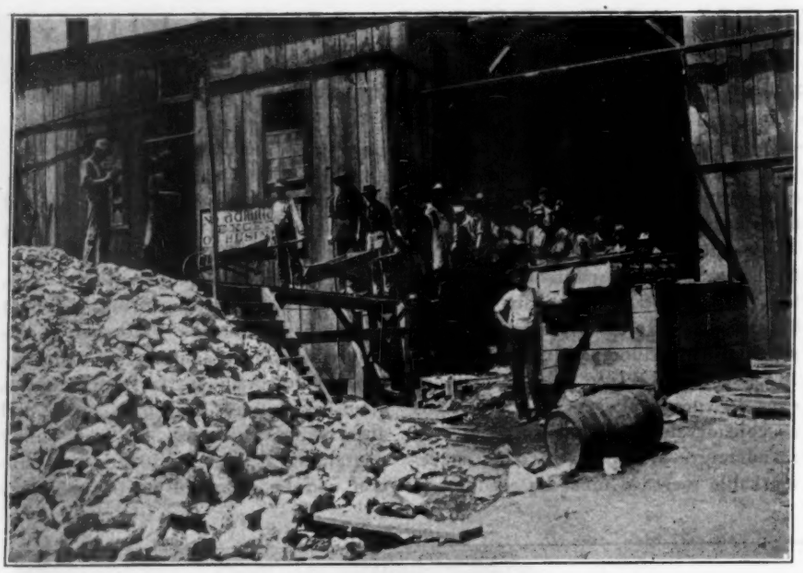


FIG. 2—LUMP FLUORSPAR AS IT COMES FROM THE MINE, FAIRVIEW, ILL.

as a flux than does limestone, particularly in fluxing refractory ores. Used for this purpose, it effects an appreciable saving in the quantity of fuel necessary to the reduction of the charge, returns a better product and yields an increase of from 3 to 5 per cent in iron output.

One of the most important fields of usefulness for fluorspar is in iron and brass foundries, where a relatively low grade spar is employed to render the metal more fluid, to permit the use of lower grade metal and scrap in greater quantities, and to carry off the phosphorus, sulphur and other impurities into the slag. It is stated that several hundred foundries are now using it in moderate quantities for these purposes. It also finds a limited consumption as a bonding for the constituents of emery wheels.

Practically all the fluorspar produced in the United States is mined in a little section comprising less than half a dozen counties bordering on the Ohio and Cumberland rivers in Kentucky and Illinois, and even in this limited district the mines are by no means numerous, not more than four or five being producers of any considerable quantity. One of the oldest and largest producers and one which is typical of operations in the district is the Fairview mine, owned by the Fairview Fluorspar & Lead Co., of Golconda, Ill. As the name implies, both fluorspar and lead are produced, the latter averaging about 3 per cent of the entire output. At practically all the fluorspar workings in this section, lead is recovered in profitable quantities.

The first development work on what is now the Fairview mine was undertaken over a quarter of a century ago, but, for a period of almost 20 years prior to 1902, practically nothing was done. About this time, the iron and steel industry awoke to the possibilities of the use of fluorspar and the rapid increase in its consumption resulted in the acquisition of this property by new interests. The old mill was dismantled, new equipment of high efficiency was installed, a large amount of underground work was carried on and the property was put in excellent condition. Under the management of the present owners, further development work of an extensive nature has been done during the last 18 months and an annual production of over 50,000 tons of all grades of spar is now possible.

As is the case with the other mines in this district, the Fairview workings are in a typical fissure vein. Operations have been carried to a depth of nearly 400 feet and development work on several levels has disclosed a uniform vein of remarkable extent and surprisingly free from impurities. In working this deposit, Prof. Fairchilds, of Colorado, has employed western mining methods with highly satisfactory results.

Owing to the fact that this fluorspar district is very sparsely settled and but indifferently provided with transportation facilities, the operation of the fluorspar mine involves a number of problems other than those directly connected with the recovery of the product. Aside from the sinking of the shaft, the driving of the various levels, the installation of hoisting, sorting and grinding equipment, etc., it has been encessary for the company to construct a railroad line of considerable length to the Ohio, this being the only railroad in Hardin county. At the river the loaded cars are transferred to a large barge belonging to

FIG. 3—TYPE OF CONCRETE HOUSES BUILT BY FAIRVIEW COMPANY.

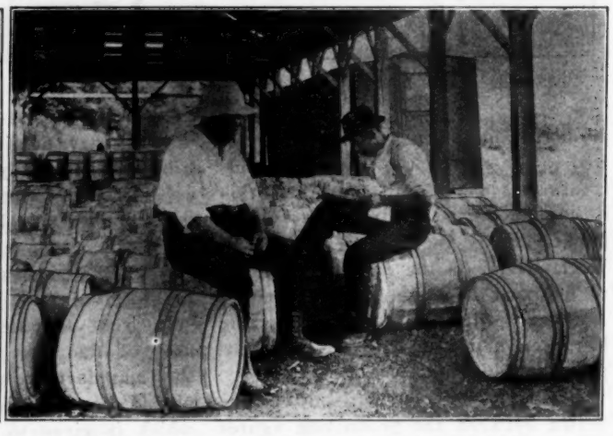


FIG. 4—GROUND FLUORSPAR READY FOR SHIPMENT, FAIRVIEW MINE.

the Fairview company and are thence delivered to the incline of the Illinois Central at Golconda. At the mine, substantial concrete houses have been erected for the clerical and working force, together with a large office and store building, these occupying a bluff overlooking the mill site.

As it comes from the mine, the fluorspar is first carefully sorted and the finest grade goes to the grinding mill, after which it is packed in barrels and sacks for shipment. This grade is used chiefly by manufacturers of hydrofluoric acid, and is nearly chemically pure, carrying 99 per cent or better of calcium fluoride and only three or four-tenths of 1 per cent of silica. The lowest grade of gravel fluorspar produced at this mine analyzes over 90 per cent, which is in sharp contrast with the usual run of foreign spar, as, in the form of picked lump, this averages only from 82 to 85 per cent. In fact, it is stated that much of the German and English fluorspar heretofore used in open-hearth steel plants and foundries has been of such low grade and so impregnated with impurities that much of its active principle was utilized in fluxing or purifying itself.

As regards the future of this industry, Ernest F. Burchard has the following to say in an advance copy of the Geological Survey report for the current year: "The great size and the purity of the fluorspar deposits of the Illinois-Kentucky district indicate that for many years they will continue the main source of domestic production."

The furnaces of the Dominion Iron & Steel Co. were idle for five days in the beginning of July, the output during the remainder of the month being 22,080 tons of steel. This included 16,405 tons of rails and 2,503 tons of rods besides steel blooms and billets.

FIG. 5—STORAGE BINS AT FAIRVIEW FLUORSPAR MINE.

IRON ORE PRODUCTION OF THE UNITED STATES.

The iron ore produced in the United States in 1907 amounted to 51,720,619 long tons, valued at $131,996,147 at the mines, according to Edwin C. Eckel, of the United States geological survey, whose report on the production of iron ores, pig iron and steel has just been published by the survey as an advance chapter from "Mineral Resources of the United States, Calendar Year 1907." As compared with the production of 1906, the most productive previous year, this was an increase of 8.32 per cent in tonnage and of 31.21 per cent in value.

Iron ore is mined for blast furnace use in only 29 states of the union, though it occurs in almost every state and territory, and by far the greater part of the ore is mined directly by pig iron producers for use in their own furnaces. The valuation which is placed on the ore is therefore entirely a matter of accounting. Some of the reports made to the survey evidently include merely actual mining cost, others contain an allowance for a sinking fund, and in still others the figures given are obviously merely convenient prices to use in charging costs against the blast furnaces. The errors that result from these various methods, however, are almost entirely in one direction—that of undervaluing the ore. If all of the iron ore were to be bought by iron furnaces in open market from an entirely distinct set of iron ore miners, the average prices paid would probably be considerably in excess of those reported. In 1907 these prices ranged, for brown ore, from an average of $1.01 per long ton in Arkansas and Texas to $3.67 in Connecticut and Massachusetts, and for red hematite from $1.06 in Kentucky, Maryland and West Virginia to $3.24 in Wisconsin.

Reports of production in 1907 were received by the survey from 169

FIG. 6—THE ONLY RAILROAD IN HARDIN COUNTY, ILL.

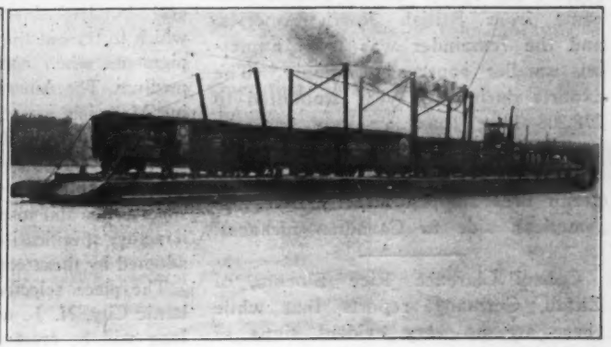


FIG. 7—FAIRVIEW FLUORSPAR CAR BARGE ON THE OHIO RIVER.

mines, the maximum production of any one mine being 2,900,624 tons, from the Hull-Rust mine in Minnesota. Ten mines, all except one being located in Minnesota, produced over 1,000,000 tons each. The 1,000,000-ton mine not located in Minnesota was the Red Mountain, of Alabama, which during 1907 produced 1,370,849 tons and ranks seventh in the list of producing mines given by Mr. Eckel.

The producing states are grouped by Mr. Eckel into four natural districts, defined by geographic and trade considerations. These are (1) the Lake Superior district, which in 1907 produced 80.51 per cent of the total ore mined, and which includes Michigan, Minnesota and Wisconsin; (2) the southern district, which produced 12.42 per cent of the total ore, and which includes Alabama, Georgia, North Carolina, Tennessee, the Virginias, Maryland, Kentucky, Arkansas, Missouri and Texas; (3) the northern district, including New England, New York, New Jersey, Pennsylvania, Ohio and Iowa, producing 5.46 per cent of the total; and (4) the western district, producing 1.61 per cent of the total ore, and including the states of Colorado, Utah, Wyoming, New Mexico, California, Washington and Montana.

The stock of ore at the mines on Dec. 31, 1907, amounted to 3,033,110 long tons, as compared with 3,281,789 tons similarly held on Dec. 31, 1906, and 3,812,281 tons on Dec. 31, 1905. The detailed figures given by Mr. Eckel, however, show that while the stock on hand at the mines on Dec. 31, 1907, was about 250,000 tons less than on the same date in 1906, the stock on hand at the lower lake ports indicated an increase of over 1,130,000 tons.

During 1907 the United States imported more than 1,200,000 long tons of iron ore. Of this total over half was from Cuba and about a third came from Spain. About 116,000 tons came from British North America, and the remainder was from numerous smaller sources of supply. The exports during the year amounted to 278,208 long tons, a slight increase over the exports of 1906. The bulk of these exports represent Lake Superior ores shipped directly from the American side to Canadian furnaces.

Consul Clarence Rice Slocum, of Zittau, Germany, reports that while there are no very evident signs of overproduction, the iron foundries in that part of Saxony are working on reduced time as a prudential measure.

PREVENTION OF CORROSION.

Tests to be Conducted by the Paint Manufacturers' Association with Various Coatings.

The extensive work of Allerton S. Cushman of the United States Agricultural Department, upon the causes underlying the corrosion of iron and steel surfaces, gave to the scientific world a clear understanding of this subject and proved the electrolytic theory. This theory attributes the solution and subsequent oxidation of iron to a transfer of electricity between the free hydrogen ions of water and the iron ions of the steel. This electrical action is very evident in those samples of steel that contain impurities having a difference in potential to that of the iron and is most marked in those samples of steel, having an uneven distribution of such impurities.

Mr. Cushman's work upon this subject led him to investigate the possibilities of securing protection for steel surfaces by the use of certain pigments and compounds. Bichromates of the alkaline earth metals when in solution, were found to give to iron surfaces perfect protection from corrosion. Even when present in extremely small quantities, these salts cause the iron to assume a passivity that persists for a considerable length of time after the metal has been washed free from the salt. For obvious reasons, these chemical products are unfit for use in paints, but they suggested the preparation of pigments from the chromates, and their trial for this purpose. Many chrome pigments were prepared and although some gave protection to the steel with which they were placed in contact, others gave a negative result and could be classed as rust stimulators.

The scientific section of the Paint Manufacturers' Association, following out and confirming Mr. Cushman's work, decided to give it a practical application and secure more definite knowledge as to which pigments are safe and which are unsafe for use in the preservation of iron. For this purpose the scientific section proposed the erection of a fence having several hundred large steel plates upon which to try out the value of the different pigments when contained within an oil medium. The American Society for Testing Materials was notified of this project and at a meeting of committees E and U of this association, it was decided that these committees would co-operate in supervising and inspecting the work; satisfactory specifications to be prepared and adopted by these committees.

The place selected for the test is Atlantic City, N. J., where a fence 300 feet long will be erected at a short distance from the shore. The fence will have ample accommodation for 300 steel plates which will rest upon girders 24 inches from the ground. The plates are to be rolled from three classes of metal, Bessemer low carbon steel, open hearth structural steel and pure ingot iron. The plates are to be 24 inches wide and 36 inches high, rolled to 11 gage, approximately ⅛ inch in thickness.

Four plates of each metal are to be used for each formula. Two of these plates are to be painted in the condition as received after previously scratch-brushing the surface, thus following out the ordinary methods of painting structural iron. The balance of the plates are to be pickled in sulphuric acid, and in order to completely remove the scale, subsequently neutralizing the sulphuric acid with lime.

The plates are to be painted under cover so as to secure equal conditions throughout the test, and to prevent the weather from interfering with the work. A uniform spreading rate is to be used for the formulas, and the work will be conducted in a thoroughly systematic and practical manner by the inspectors and painters chosen for the work by the committees. A series of unpainted plate will be placed upon the fence with the painted plates, so that the rapidity of corrosion of the various metals may be watched.

Preliminary laboratory tests have been conducted by the various members of the committees and by the scientific section to ascertain the rust-inhibitive values of the various pigments when placed in contact with steel surfaces, enveloped by water. These tests and others carried along similar lines give the requisite data upon which to base the formula for the field test. Pigments of different types will be selected, those having rust-stimulating properties and those having rust inhibitive values will be tried out in the same manner, ground in the same vehicle and applied to the same kind of metal.

At proper times the various committees will make inspections of the fence to note the wearing qualities of the different formulas, and reports will be issued when it is deemed advisable, giving the results of the test.

The production of manganese ores in this country in 1907 was 5,604 tons, valued at $11.31 per ton, compared with 6,921 tons valued at $12.73 per ton in 1906, and 4,118 tons valued at $8.80 a ton in 1905. The imports of these ores were 299,032 tons in 1907, 221,260 tons in 1906, and 256,033 tons in 1905.

The estimated production of the Lake Superior mines in July was 19,108,875 pounds of copper. This compared with an estimated output of 18,661,675 pounds in July, 1907.

ELECTRICAL INDUSTRIAL HAULAGE

By F. E. Van Slyke

Many large industrial establishments, warehouses, etc., employ yard gangs in shifting cars and in transporting materials from point to point about the plants, under conditions which are favorable to electric haulage, and where its adoption would be assured if the matter could be presented in such a way as to convince the managements that a substantial reduction in operating expenses would result.

The purpose of this article is not to cover the broad field of industrial haulage, but rather to cite a few instances where the use of electric locomotives has been of great service, not only in reducing the cost of moving cars, materials, etc., but in facilitating the general work.

Electric industrial haulage may be classified under two general heads: 1. Handling standard gage freight cars, requiring a comparatively large draw bar pull for short periods of time at infrequent intervals. 2. Moving raw and finished materials, castings, pig iron, etc., from one building to another, requiring a small draw bar pull for short periods of time at frequent intervals.

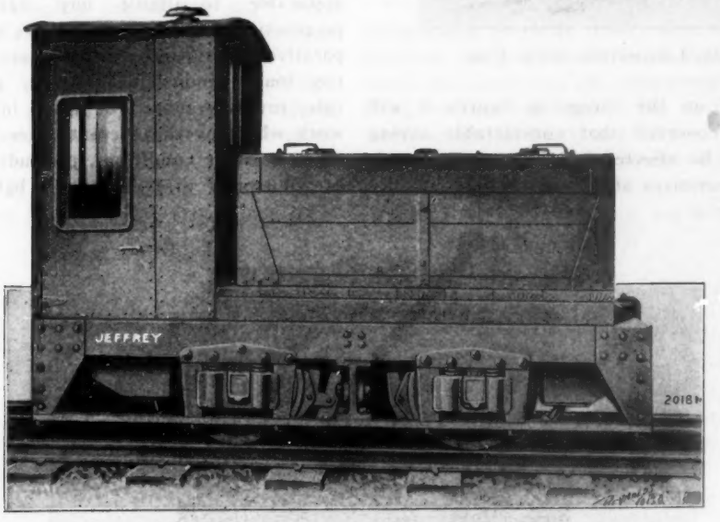


Fig. 1—6-Ton Storage Battery Industrial Locomotive with Cab.

In every large city there are warehouses loading and unloading from 10 to 20 standard gage railroad cars per day, and as usually the railroad switch engine is not available oftener than once a day, and in some cases not oftener than two or three times a week, it is necessary to have from two to four laborers employed constantly in barring the cars, in the processes of loading and unloading, from one position to another.

Fig. 2—13-Ton Trolley Industrial Locomotive with Cab.

Where it is desirable to handle only one car at a time and the track is approximately level, an electric locomotive weighing from six to eight tons is of ample capacity. The total mileage per day in moving 10 to 20 cars over short distances would not exceed two or three miles at most, so that the power consumption is a small item. For the same reason, the interest, depreciation and maintenance will not exceed the figures given in the accompanying table. Most manufacturing plants have their own generators, and warehouses are usually so situated that power can be secured from a street railway circuit.

For the work described above, there is a choice of two types of locomotives—one operated by current taken from an overhead trolley and the other by a storage battery.

The following table gives the approximate cost of operating each type of locomotive as compared to that of employing two or four laborers to do the same work.

Comparative Operating Costs.

7-ton trolley locomotive	$1,900
3,000 feet trolley wire, bonding, etc.	1,000
Total	$2,900
Interest on investment at 6 per cent	174
Depreciation and maintenance at 10 per cent	190
Power, oil and waste, estimated	50
One man, one hour per day at 20 cents per hour for 300 working days	60
Total yearly operating expense	$ 474

7-ton storage battery locomotive	$3,400
Interest on investment at 6 per cent	204
Depreciation and maintenance at 10 per cent	340
Power, oil and waste, estimated	50
One man, one hour per day at 20 cents for 300 working days	60
Total yearly operating expense	$ 654

Two laborers at $1.75 per day for 300 working days	$1,050
Four laborers for same time	2,100

As the locomotive will only be in service for a very short time each day, it is often possible to arrange for a man to act as motorman who has other duties to perform about the plant, in which cases there would be no extra charge for an operator. In making the comparison this charge has been figured as one hour per day which is ample under the conditions usually encountered. If the work is sufficient to keep a motorman busy all or a considerable portion of the day, the locomotive would take the place of a large number of laborers and the saving would be proportionately greater than the figures given.

Storage Battery Locomotive vs. Hand Labor.

2½-ton locomotive	$1,800
Interest on investment at 6 per cent	94
Depreciation and maintenance, at 15 per cent	270
Motorman at 20 cents per hour, for 10 hours per day for 300 working days	600
Power per year at 5 cents per Kw.-hr. 5 Kw.-hrs. per day	75
Oil, waste, etc., estimated	10
Total yearly operating expense	$1,059
Six laborers at $1.75 per day for 300 working days	$3,150

FIG. 3—25-TON TROLLEY INDUSTRIAL LOCOMOTIVE WITH CAB.

Under the second heading are classed those manufacturing concerns, in which there are usually employed from 10 to 50 men, possibly more, moving small loaded and empty industrial cars containing raw and finished materials from one building to another and to and from the various machine tools in the same buildings.

For work of this kind, small storage battery locomotives weighing from 2½ to 6 tons have proven economical. The following table gives the comparative cost of moving material about an industrial plant with a 2½ ton storage battery locomotive which took the place of six, and at times eight, laborers. This locomotive operated continuously on from three to four charges per week, hauling at times as high as 25-ton train loads.

From the foregoing figures it will be observed that considerable saving can be effected by the use of electric locomotives and there are undoubtedly thousands of places where as great or even greater economy might be effected. The economy in operating cost is often secondary to the saving which results indirectly from the ease and facility with which the material is moved, and which has not been considered in the above comparative tables.

The following table shows the gross weight of trains which a locomotive of given weight can haul under average conditions. This table will be of considerable assistance in determining the size of locomotive for any particular conditions.

Gross Train Loads in Tons.

Locomotive weight, tons.	Level.	Two per cent grade.	Four per cent grade.	Six per cent grade.
2½	25	12	7	5
5	50	23	13	9
10	100	45	27	18
15	150	68	40	26
20	200	90	53	35

Where the car bearings and track are in good condition, the locomotives will haul from 25 to 50 per cent in excess of the weights given in the table, while with poor track and car conditions the maximum loads may be less.

Storage Battery Locomotves.

The storage battery locomotive is applicable to almost any haulage proposition where the grades are comparatively easy and the hauls are not too long. Industrial haulage, as a rule, involves more or less indoor work where overhead cranes, low ceilings, or other conditions, preclude the use of trolley wires, so that a battery locomotive is the only solution of a cheap, and efficient haulage.

FIG. 4—1½-TON TROLLEY INDUSTRIAL LOCOMOTIVE WITHOUT CAB.

In cotton, flour, paper and lumber mills, grain elevators and similar industries, the use of other forms of locomotives is usually prohibitive owing to fire risks, and as the material

handled in such places does not often run high in tonnage, the battery locomotive is an ideal equipment.

Generally speaking, the size of a locomotive can be determined by the grade of the track and the maximum train load to be hauled. Figures showing the gross weights of trains, exclusive of the locomotives under average conditions for locomotives from 2½ to 10 tons weight inclusive, are given in the following table:

Gross Train Loads in Tons.

Locomotive weight, tons.	Level.	2 per cent grade.	4 per cent grade.
2½	25	11½	6½
5	50	23	13
7½	75	34½	20
10	100	46	27

These figures should be used for estimating purposes only, as there are a number of other conditions requiring careful consideration before a final decision can be made. The following questions must usually be considered before definite recommendations can be made:

Maximum and average grades; maximum, minimum and average length of haul; maximum, minimum and average weight of train; total mileage per day; total weight of material to be moved per day; gage of track; voltage of circuit available for charging.

A complete log of one day's work together with a plan of the trackage is of very material assistance.

For the conditions usually encountered around manufacturing plants where the track is level and the maximum load to be hauled does not exceed 25 tons, a 2½-ton battery locomotive is the proper size. This locomotive will operate from one to two days on a single charge, depending upon the character and frequency of the service. When the locomotive is handling fairly heavy loads constantly, it is advisable to give the batteries a short charge during the noon hour.

For service combining a long heavy haul with a considerable amount of switching, a combination trolley and battery locomotive is recommended. The use of the battery eliminates the complicated overhead trolley wire construction at the switches and sidings, saves the motorman the annoyance of being obliged to watch the trolley when crossing frogs and allows the locomotive to run into buildings at any point along the line.

With this equipment, it is not necessary to have any regular charging periods, the battery being kept charged from the trolley wire by the motorman throwing suitable charging switches whenever the locomotive may be idle. Where there is a sufficient amount of copper in the line to insure a fairly constant voltage, it is possible to run the locomotive from the trolley wire and charge the batteries at the same time.

As a description of equipments in actual operation is of more value than suggestion, to parties considering a battery locomotive installation, I will attempt to describe briefly two typical plants, one using small locomotives hauling light trains over short hauls and the other comparatively heavy trains on what is considered long hauls for storage battery work.

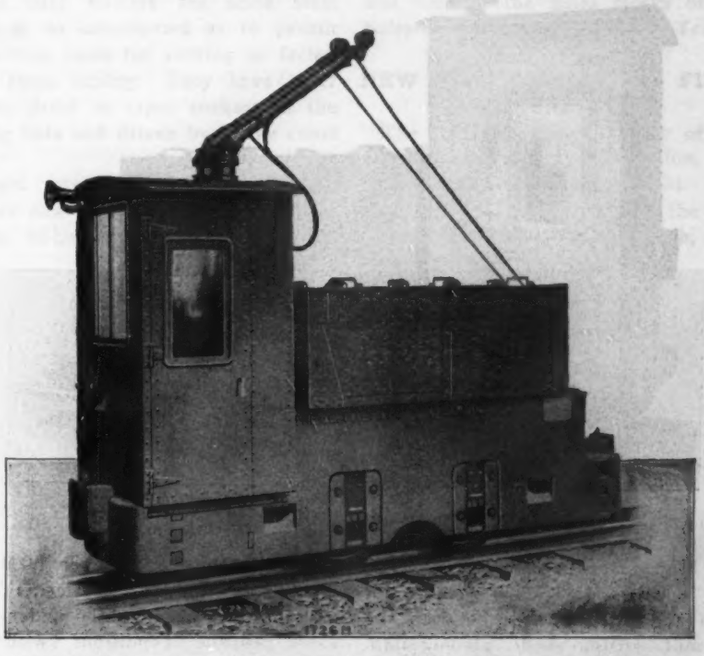


FIG. 5—7-TON STORAGE AND TROLLEY BATTERY INDUSTRIAL LOCOMOTIVE WITH CAB.

FIG. 6—2½-TON STORAGE BATTERY INDUSTRIAL LOCOMOTIVE.

The Compania Minerva, Fundidora y Afinadora "Monterey" has an interesting installation of four 2-ton Jeffrey locomotives handling slag pots at the smelting plant in Mexico. Each locomotive weighs 2 tons and is equipped with one 6 horsepower motor, a 10 kilowatt-hour battery and the necessary controlling apparatus. The motor is mounted on the driving axle and 1¼ tons is available for traction. The work consists of moving 4,800-pound slag cars a distance of 300 feet and returning the empties. Each locomotive handles 15 loaded cars per hour for a period of 12 hours with a single charge. As the plant is in operation continuously, the work is divided into two 12-hour shifts, two locomotives operating during the day and two at night.

To illustrate the heavier service, attention might be called to the Potlatch Lumber Co.'s plant at Potlatch,

Idaho, which is one of the largest storage battery installations in existence. The apparatus consists of five 7-ton locomotives and a complete charging station furnished by the Jeffrey Mfg. Co., Columbus, O. The work consists of hauling trains of green and dried lumber between the saw mill, sorting sheds, planing mill, dry kiln, storage sheds and loading docks. In considering the various methods of haulage adaptable for this plant, it was found that the work was too heavy for horses, and steam and gasoline locomotives were out of the question on account of fire risk, so there was only left for consideration, the electric locomotive equipped with trolley or battery or both trolley and battery. On account of the complex system of wiring required for 50 miles of track, the decision was finally made in favor of the battery locomotive without trolley equipment.

FIG. 7—7-TON STORAGE BATTERY INDUSTRIAL LOCOMOTIVE.

On hauls averaging ¾ of a mile, each locomotive is hauling as high as 450 ton-miles of lumber per day of 10 hours, on a single charge, with a short extra charge during the noon hour.

From a description given in the *St. Louis Lumberman* of July 1, it will be noted that the cost per 1,000 feet of lumber moved is 7 cents during fair weather, while under the worst possible conditions with the track covered with several feet of snow, the cost never exceeded 8.7 cents per 1,000 feet. The cost of doing the work with horses was 11 cents per 1,000 feet of lumber moved and this price was only possible under the best conditions of weather and track. During the heavy snows, the cost of horse haulage doubled or trebled and often the plant was completely shut down on account of the inability of the horses to get about.

FIG. 8—4-TON STORAGE BATTERY LOCOMOTIVE.

In order to insure the greatest success in the use of storage battery locomotives, it is advisable to have each proposition looked into carefully by some one familiar with this class of apparatus. A careful study of the total amount of work to be done is essential, as in a large number of cases that item is very much overestimated.

A NILES 20-FOOT BORING MILL.

The accompanying illustration shows a Niles 20-foot boring mill, which is installed in the shops of the Nordberg Mfg. Co., Milwaukee. This tool has an actual swing of 242 inches and a total height under the tools of 10 feet. The bars each have a travel of 6 feet, while the table is 192 inches diameter.

The table is so heavily constructed that it will support the greatest loads that can be placed on it and permits sufficient clamping for the heaviest cuts without distortion or springing. It is liberally provided with T-slots for heavy bolting. The table rack, which is bolted to the table, is cut from the solid. The driving pinions and the driving gear inside the bed are of forged steel. The large gears outside the bed and the table rack are made from a special grade of semi-steel.

The table runs on a wide annular bearing in the bed flooded with oil, thus providing a large supporting surface for the load with a minimum of friction. In addition to this bearing, the lower end of the spindle rests on a step bearing of bronze and steel washers flooded with oil, which is used when running the table at high speeds for boring out relatively small holes. Means are provided for lifting the table off the annular bearing when the spindle step bearing is used.

The spindle is forced into the table and bolted to it with a large number of heavy bolts. Its upper bearing is 26 inches diameter and runs in a taper bush in the bed. The bush is slotted at the top and bottom and can be adjusted to take up wear. The lower spindle bearing is self-contained with the bed, by means of a large, cone-shaped brace bolted to the under side of the bed, and, in turn, is supported by heavy jack screws on a sole plate carried by the foundation. The housings carrying the cross rails are of heavy box girder section, the front post being 20 inches wide on the face. The housings have ample bearings on the bed and are united at the top by a heavy square box girder cross tie placed flush with the front of the housings. In addition, there is a heavy cross tie of circular section placed near the top of the housings immediately back of the cross rail.

The cross rail is heavy and of deep section with a front slide face for the

saddles 42 inches wide. Power adjustment is provided by means of a 10-horsepower motor located on the top brace. The elevating screws are of heavy section and quick pitch, to give a rapid movement to the rail.

The saddles are clamped top and bottom to the cross rail, and provision is made for taking up wear at the top, bottom and rear by means of taper gibs. They are fed along the cross rail by heavy screws, each saddle having its own feed screw. These besides being supported in the saddles, are supported at the end by a thrust bearing and a support for the rods is provided in the center of the rail. In this manner the unsupported portion of each screw and rod is reduced to a minimum.

The control of screws and rods is partly in the saddles and partly in the ends of the cross rail. It is possible to throw in or out either screw or rod at the saddle. The direction of the feed is controlled by a lever in the feed box located on the side of the bed.

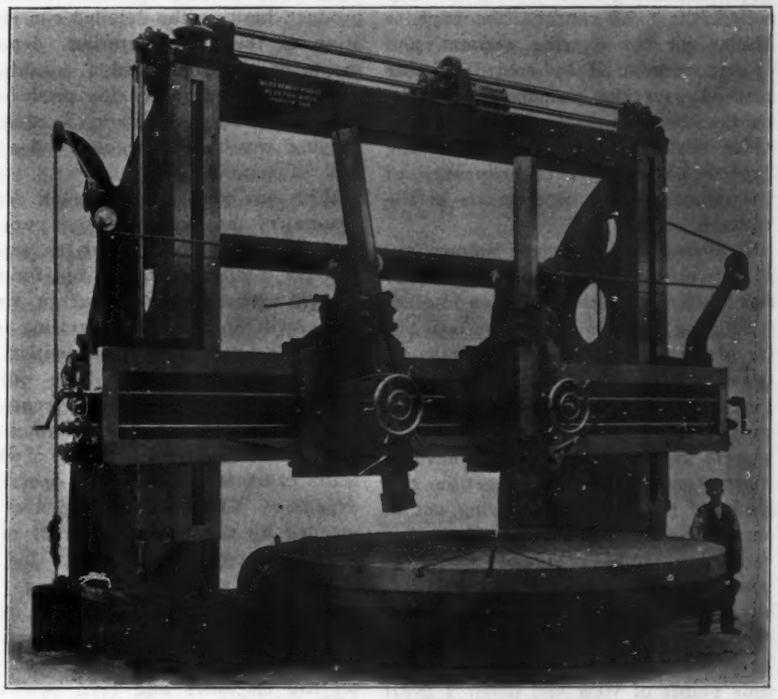
The swings are graduated and adjustment is provided by worm and worm-wheel and rack and pinion up to 20 degrees inward and 40 degrees outward. The swing is centered on the saddle on a central sleeve, which allows its swinging with a minimum of friction. It is held up by heavy bolts on a large bolt circle, in addition to the clamps at the top of the saddle. Both saddles have quick adjustment by hand and power along the cross rail. The quick hand adjustment of the bar is so arranged that but little exertion is required to bring the bar up or down at a fairly rapid rate.

The bars are of octagonal section and are fitted on four sides, thus permitting the taking up of wear in any direction. The bar has a long bearing on the swing, which will permit an overhang of 6 feet or more without danger of lost motion. The section is so heavy that, with the heaviest cuts of which the machine is capable, there is no possibility of the bar springing.

The bars are so counterweighted that one balances the other without any side strains being brought on the saddle. The saddles may be in any position on the cross rail, or the swing may be at any angle without interfering with the counterweighting, or with the movement of the saddle along the cross rail. The counterweight chains are so placed as to not interfere with the chains of an overhead crane placing work on the table. The counterweight brackets at the end of the cross rail are set off, so as not to interfere with the swing of the bars when the saddles are at the extreme end of the rail.

The tool holders are solid steel forgings so constructed as to permit of holding tools for turning or facing with equal facility. They have taper shanks fitted in taper sockets in the boring bars and driven by heavy cross keys.

Rapid traverse by power for the saddles and bars is provided by means of the 10-horsepower motor used for elevating and lowering the cross rail. The operating lever for this mechanism is at the side of the housing.



20-Foot Niles Boring Mill in Shops of Nordberg Mfg. Co.

The feeds are positive through gearing. Separate feed mechanisms, located at each side of the machine, are provided for each bar. The feeds operate horizontally on the saddle and vertically or angularly on the bar. They are reversed or changed from roughing to finishing by means of convenient handles at each side of the machine. The changes of feed for a given set are made at the end of the cross rail. Eight changes of feed are provided, ranging from 1/32 inch to 1¼ inches per revolution of table. Four changes of speed by gearing with a 2 to 1 variation in the motor give a range of table speeds from 1/3 revolution per minute to 11 revolutions per minute. On a full swing this gives 20 feet per minute cutting speed and on 7 inches diameter it gives 20 feet per minute as a maximum cutting speed.

The machine is driven by a 40-horsepower variable speed motor. It was built at the Niles works of the Niles-Bement-Pond Co., New York.

NEW PLANT ROLLS ITS FIRST BAR.

The newly completed plant of the Joliet Iron Products Co., Joliet, Ill., rolled its first bar iron Aug. 21. The company was organized, and the mill construction begun last March, for making bar from scrap. The main building, of steel construction, is 94 x 270 feet, with an addition on the west side of the plant 38 x 90 feet. Beside these buildings there is a brick structure housing the electric plant, which includes a Fleming-Harrisburg 150-kilowatt generator. The mill equipment includes a 22-inch combination roll train and 12-inch finishing mill, and puddling and heating furnaces with a capacity of 500 tons a day. All the machinery, except the rolls, is driven by electricity.

The Pittsburg, Bessemer & Lake Erie railroad for July hauled a total of 741,000 tons of ore from the docks at Ashtabula and Conneaut to Pittsburg. This is the largest tonnage for any month, but one, in the history of the road.

APPORTIONING OVERHEAD CHARGES TO FLAT COST[1]

By Oscar E. Perrigo

The problems of accounting for the cost of manufacturing operations are many and various. Often those which at first appear to be simple and readily solved, prove to be exceedingly perplexing and difficult to satisfactorily handle. Probably the one point upon which there is the greatest amount of disagreement is that of handling the overhead charges, or as variously called, the fixed charges, the expense burden, or the expense account, and of apportioning it by some equitable method over the product turned out by the shop, so that each job or each order shall bear its fair share of the burden of the general expenses of the manufacturing departments of the concern.

Realizing the immense importance of a proper and accurate handling of this matter of overhead burden in manufacturing operations, and the possibility of great losses due to carelessness, or a lack of appreciation of the importance of the subject, manufacturing experts, factory managers, engineers and accountants, have devoted much time to the investigation and study of the problems growing out of the conditions which experience has evolved. Those problems which at one time seemed to the expert in accounting to offer trifling obstacles to their ready and accurate solution, have been conscientiously studied from various points of view and under a great variety of circumstances and conditions, their real values and importance understood, and deductions have been made for their proper solution.

But new conditions and new facts confront the engineer and the accountant at each succeeding investigation of the manufacturing operations of a new plant, until the field for profitable examination and study seems to be limitless. It is a generally recognized fact that each manufacturing plant is unique in itself and always possesses some features distinctly different from those hitherto examined, and which must be handled according to the local conditions.

Among all the problems in this complex question, that which concerns the distribution of the overhead burden of a manufacturing plant, will be found to be beset with more varying conditions, and to be subject to more diversified opinions than all others which relate to the question of shop and factory accounting. In this consideration of the question of apportioning the overhead burden to the "flat costs" we shall eliminate entirely the question of administrative expenses of the general office and also the costs of advertising and selling the product, limiting the detailed consideration to the manufacturing departments of the plant, and a consideration of their expenses for productive and non-productive labor, fixed and varying overhead charges, and the cost of material.

With any sort of a common sense system of bookkeeping it is not a particularly difficult matter to ascertain the total amount paid out for the general expenses of the concern, since these will include all operating expenses except those for productive labor and material. But here enters one of those questions that frequently give trouble in the solution of these problems, and usually when least expected. What are operating expenses? Clearly, those expenses demanded by the daily routine of manufacturing operations. True. But in the regular work of operating the plant there must be bought or made tools for hand use, tools to be used in the machines, attachments for use on the machines and even new machines, all of which are necessary for the economical machining of the product. What portion of these shall be charged to general expense? Naturally a part of these expenses will be charged to equipment. Here accountants will disagree. Jigs and fixtures are required for which must be made drawings and patterns, as well as the fixtures themselves. Shall these be charged to the expense account or shall the entire cost of making these accessories go into the equipment account along with the machines which they help to render economically operative?

A promiennt author in discussing this matter concludes that all drawings, patterns, tools, jigs, and fixtures should be charged to the expense account because "to the purely commercial mind, taking nothing on chances, the forced sale value must appear to be the only proper value to be given to the factory plant in the accounts. In the case of a forced sale, drawings, patterns, and special factory tools are found to be absolutely without buyers. To the mechanical mind it seems preposterous to write all costs of these highly valued shop treasures directly into the expense account." To the practical business man endowed with mechanical as well as commercial ideas, the going concern with all its machines and tools, regular or special, in use at their highest efficiency is his aim and ambition and he is likely to reckon on that basis, rather than to have ever before his mental vision the shadow of the auctioneer and the sheriff. Certainly men will make mistakes in judgment of business conditions and losses will ensue. But not more in manufacturing enterprises than in any other business. The stock broker conducts a business with much more liability to loss through depreciation, but his accountant does not enter securities at their forced sale value.

Therefore it seems fair to consider the manufacturing plant in the light of a live, going concern, with the usual prospects for good business. Its operations are directed by a man possessing a natural ability for judging commercial opportunities and business conditions, and a fair amount of appreciation of the value and excellence of good original designing, as well as of the fact that the development and evolution of mechanical operations require the adoption of improvements from time to time in order to keep pace with legitimate competition.

Adopting this view we find that the overhead charges will consist of three factors, which may be summed up as follows:

Fixed Charges, covering interest upon the cost of the land, buildings, fixtures, power, lighting, heating and transportation plants; insurance, taxes, water rates, etc., the cost of maintenance and the charges for depreciation.

Expense Burden, including the cost of so-called non-productive labor, the cost of lighting, heating, ventilating, cleaning, transporting material, the interest upon the cost and installation, and the depreciation charge upon machines.

Supplemental Burden will be the cost of the temporarily idle machines, which

[1]Twelfth of a series of articles on Shop Management and Cost Keeping.

with the exception of the cost of power, cost as much as when working at full efficiency upon useful product.

Overhead Burden will be the sum of the above three accounts, although the method of bringing them into the burden account varies with their individual characteristics.

Our problem is the proper apportioning of these charges to the *Flat Cost* of the product. What is the flat cost of the product? We may analyze and classify the various factors of manufacturing costs in the following manner, without going back to the elementary accounts by which these factors are determined.

The different classes of accounts or costs with which we have to deal in this article will be:

Labor Cost. The amounts paid for productive or direct labor, or labor applied directly to the product, whether for operations on a machine or by hand.

Material Cost. The expense of all material that goes directly into the product and becomes a part of it.

Overhead Burden composed as above.

There will also be the following accounts, taken incidentally into the progressive arrangement that follows.

Administrative Expenses. The expenses of the general office, including salaries, interest, insurance and maintenance of real estate, office fixtures, etc., and the cost of office supplies, including telegraph, telephone, express, postage, legal, traveling, and similar expenses; but not including any of these items in the sales department.

Selling Expenses. The same list of expenses as given for the general office, to which are added Advertising, Commissions, Allowances, Discounts and similar expenses incident to marketing the product.

Profit. Such a percentage of the manufacturing cost as the management may determine and the state of the market permit.

To apply these factors in their relative and progressive relations we will have:

1. Labor Cost, Material Cost } Flat Cost.
2. Flat Cost, Overhead Burden } Factory Cost.
3. Factory Cost, Administrative Expenses } Manufact'g Cost.
4. Manufacturing Cost, Selling Expenses, Profit } Market Price.

For ascertaining the proper relation between the flat cost and the overhead burden there have been a number of plans proposed. The two principally used, with some variations to suit local and individual conditions have been as follows: The first of these methods is often called "the hourly plan." By this method there is charged to each job or order a percentage of the total amount of overhead burden in proportion to the number of hours of direct or productive labor. This is found by dividing the total overhead burden by the total number of hours of productive labor worked for a given period, say three or six months, or a year, thus obtaining an hourly rate which may be added to each hour of productive labor on the order, in addition to the cost of material used, to ascertain the flat cost of the job. The plan is defective, as it places all classes of labor, whether skilled or unskilled, and whether working with a few hand tools or with an expensive machine, on a level. By this method a job done largely on machines would not bear its fair share, while a job done by hand at the bench would bear an excessive amount of burden.

Again, if two men receive the same wages, one of them operating a small lathe and the other a large planer, the burden charged for an hour's work would be the same for the small lathe as it would be for the large and expensive planer. In actual practice this problem will appear in this manner. Consider a job done on the small lathe:

Machine rate ...10 cents per hr.,
Wages of man..25 cents per hr.,

Total .....35 cents per hr., or $18.90 per wk.

In the case of the job done on the large planer:

Machine rate ...30 cents per hr.,
Wages of man..25 cents per hr.,

Total .....55 cents per hr., or $29.70 per wk.

By the above "hourly plan" or averaging plan each job would be charged with $24.30 per week, charging one job $5.40 more than is equitable, and the other $5.40 less than it should pay. The defects of the plan are thus glaringly apparent. Of course, not all jobs will show as great a discrepancy as this one, but the fallacy is only one of degree, and the principle involved will be the same in all cases.

This averaging process of dividing the burden must necessarily result in an overcharge on small work and an undercharge on large work. To work with any reasonable degree of accuracy and equity it would require that the employes be on a near equality as to wages, and the work done in machines of nearly equal cost, occupying the same area of floor space and absorbing an equal amount of power. These conditions will seldom be encountered, over an entire factory, and never in a machine shop.

The second plan, usually called the percentage plan, assesses the overhead burden on a basis of the cost for direct or productive labor on each job or order. In this case the total overhead burden is divided by the total amount paid for direct labor for a given period, as previously explained, and, using this quotient as a percentage of burden, it is to be added to the cost of direct or productive labor and material on each job. One of the fallacies of this plan is that it takes no account of the very important factor of time. For instance, if a low priced man occupies twice the time in doing a job on a certain machine, as a man getting double the pay, it naturally follows that while the cost of direct labor has been the same, the cheap man has occupied the machine twice as long, and yet the overhead burden charge has been the same.

The actual result with a properly fixed machine rate, as in the last case, will be as follows:

In the case of the low priced man:

Machine rate, 2 hrs. @ 30 cents.....60 cents
Wages of man, 2 hrs. @ 15 cents.....30 cents

Total .....90 cents

In the case of the high priced man:

Machine rate, 1 hr. @ 30 cents.....30 cents
Wages of man, 1 hr. @ 30 cents.....30 cents

Total .....60 cents

By this it will be seen that the job will actually cost 50 per cent more when done by the low priced man than if done by the high priced man, which is in line with the usual shop practice. If the percentage plan is used the cost would be the same, but there would be this very important difference, the output per day or week would be reduced 50 per cent, which is an important phase of the question.

This is manifestly wrong, and might easily make a great deal of difference in the correctness of resulting accounts, particularly in a shop where there is a great diversity in the cost of machines in use. In fact, it might render the method useless so far as giving accurate, or even uniform results is concerned.

A competent authority thus comments on these two plans. "The most unsatisfactory feature of both plans is that they make no provision for charging against a piece of work the interest and depreciation belonging to the machine on which the work was done. Both plans add the gross interest and depreciation to the other items of shop expense and then charge the total amount against the work on a flat rate or average basis which ignores the individual machines. On small and medium size machines the interest and depreciation item is of small importance, but on the large

ones it is the most important of any, and, indeed, on very large ones more important than all others added together."

While the time or hourly plan corrects some of the defects of the plan of percentage of burden to the cost of labor plan, it brings in quite as erroneous ones of its own. It takes no cognizance of the value of the machines used, whether they cost 100 dollars or several thousand, and a speed lathe might be assessed with just as much burden as a 72-inch planer. Again, a boy earning six dollars a week would count for as much as a machinist getting three dollars a day, so far as the overhead charges are concerned.

This plan would work many glaring errors, particularly in a manufactory with a large variety of machines, and where the work ranges from comparatively small to quite large and heavy parts. In manufacturing establishments where the work is quite uniform and the machines upon which it is done are nearly of the same first cost, and where the wages of the operatives do not vary to any considerable extent, either of the above plans may answer all reasonable requirements.

However, if we carefully consider the questions we shall be forced to the conclusion that where these conditions do not prevail we must look for some more comprehensive plan that will be better adapted to the requirements of the case, and one that, while necessarily more intricate and difficult to administer, will give with a reasonable degree of accuracy the actual costs of products, and enable us to know in what departments profits and losses occur, and what product, department, or individuals are responsible for the one condition or the other.

To do this we must take a comprehensive view of the question and not content ourselves with the idea that all the factors in the case are considered at their proper value when we say that we have labor, so much; material, so much; and general expenses, so much; and that the sum of these is the total cost. As to total amounts this may be perfectly correct, but it is detailed information that we want. We know that the total is so much, but why is it such a large amount? To answer this question we must analyze this expense and ascertain what are its component factors.

Neither can we consider in lump sum such expenses as interest, insurance, depreciation, and similar burdens, since some of these will enter into plant accounts, some into equipment accounts, and some will be chargeable to the labor account. It is true that all expenses for interest, insurance, depreciation, etc., must eventually be borne as a part of the cost of the product, but the time and the method of taking them into the account are matters to be carefully considered if we are to avail ourselves of the opportunities which this operation presents to record and make use of the valuable detailed information that may be derived from the procedure at this stage of accounting. We must know the details of these matters; for what purpose the money was spent; and to what accounts it must be charged, in order to obtain a control over these expenses which will be of value in our effort to reduce them to an economical basis. To obtain this detailed information we must go back to the origin of the various matters which occasioned the several items of expense.

We have men and machines. We must have buildings to house them and consequently land upon which to erect these buildings. These buildings must be lighted and heated. We must provide for the transportation of stock and material. There must be an equipment for fire protection. These costs will all be subject to a 5 per cent interest charge, another 5 per cent for depreciation and the cost for maintenance and fire insurance. Lighting and heating must be provided for in a similar manner and subject to like charges, except insurance. There will also be the wages of all non-productive employes, such as the shop superintendent and his office force, foremen, tool keepers, watchman, sweepers, carpenters, inspectors, laborers, and all others who do not work directly on the product of the concern. The sum of all these items divided by the floor area in square feet will give us a factor called "floor rate" which we can use as one of the components in determining a rate for machines and men.

The cost of power will include the percentages on first cost of the equipment for that purpose and its installation; its depreciation; its maintenance and operating expenses of labor, fuel and supplies. From the horsepower generated we obtain the cost of power per horsepower hour. This is done by dividing the entire expense of generating power by the total horsepower generated, say for a year, and dividing this by the working hours for a year, now assumed to be 2,700.

We obtain an hourly rate for a machine by the use of these items; (a) 5 per cent interest and 5 per cent depreciation on its cost and the cost of installation; (b) maintenance; (c) insurance; (d) floor rate, calculated as the number of square feet actually occupied by it and the space necessary to handle the work; and (e) the cost of power, ascertaining the power required and using the cost per horsepower hour.

In assessing the value of machines for the purpose of obtaining a machine rate it is not necessary to assess them separately at their actual cost. The results may be obtained with sufficient accuracy by dividing them into classes, commencing with class A, all machines costing less than $500; class B, $500 to $1,000; class C, $1,000 to $1,500, and so on. This will simplify the matter considerably, and will not affect adversely the value of the results.

The man rate we obtain by (a) assessing pro rata to the men all the floor space not assigned to the machines; (b) the cost of consumable supplies; and (c) the cost of liability insurance.

There is one other fatcor to be taken care of. This is the machine rate on idle machines. While this varies widely in different shops it is an important matter for two reasons. First, it costs as much, with the exception of the charge for power and repairs for an an idle machine as for one working at its full capacity. Second, the idle machines are usually the larger and higher priced machines, and therefore the more necessary to look out for, on the score of economy. Each machine should be numbered in large, plain figures in some conspicuous place. The cost clerk should have a book in which he records the number, the machine rate and a record of its idle and running time. The latter record he will obtain from the time cards, which should always give the machine number as well as the man number on every job done upon a machine.

The idle machine record will be made up once a month, and the sum of the hourly rate of all idle machines during the month pro rated over the entire number of machines, increasing their rates by the amounts thus ascertained for the following month. In cases where the fluctuations in this account are slight, longer periods may be used, say, three or six months. However, the prime object of this ac-

count is not so much to ascertain and account for the exact machine rate to the fraction of a cent per hour, although that is valuable, as to keep the record of idle machines for administrative purposes and as an indication of machine efficiency and shop discipline, in which capacity the information derived is of much use to the superintendent and factory manager.

By this method we shall frequently ascertain that there are machines in the shops that are adapted for some special work only, and that are idle for such a large portion of the time that they are extremely unprofitable, or that entail such a positive loss that they should be sold, or replaced by other machines better adapted for the work.

To carry this idea a little further and to effect still further good results the record of machines should be separated into an account for each department. This will bring the matter home to the head of the department. It will exhibit the relative machine efficiency of the different departments. If we can show a foreman that his machine rates, and hence his costs, are being materially increased by several machines being habitually idle, he will either get busy in finding profitable work for the machines or getting rid of them altogether.

Frequently a machine that is idle much of the time in one department may be transferred to another department where it may be profitably employed. This fact, being demonstrated, will be of value in bringing the foremen together in discussing these matters and the foreman who has more work of a certain kind than he has machines to do it with will be alert to find another foreman who has such a machine and not enough work to keep it occupied. An exchange will be effected that will be a saving in idle machine rates to one department and an increase in the machine capacity of the other, and consequently of considerable value to the plant in a general way. Usually such good results will be automatically brought about, without the intervention of the superintendent or controlling authority. There will also be the continual tendency to keep the foremen alert to a higher plane of machine efficiency for the entire plant.

SOME NEW ATTACHMENTS FOR THE MILLING MACHINE

The R. K. LeBlond Machine Tool Co., Cincinnati, has placed on the market several new milling machine attachments designed to enlarge the scope of the plain miller. All of the attachments can be readily adjusted to either the plain or universal milling machine. Each one has been thoroughly tried out and tested before being offered to the public.

Universal Spiral Gear Cutting Attachment.

The universal spiral gear cutting attachment, Fig. 1, is designed for cutting spirals or worms on the plain milling machine. The swivel movement to the cutter head, which can be turned completely around through an arc of 360 degrees, makes it also well adapted for cutting racks, screws, etc., and for cutting gears of a greater angle than 50 degrees on the universal milling machine. There are several novel features embodied in this design. The attachment is bolted to the column and the outer end is supported by the arm of the machine. The drive is from a clutch gear on the spindle, through a series of spur and bevel gears in the cutter spindle. The cutter spindle is carried in a slide, which can be adjusted laterally by an adjusting screw and clamped into position when properly aligned. The cutter is carried central between two bearings, the outer one of which is located in the removable head, so that the cutter can be inserted. In setting the cutter the main slide is adjusted laterally until the center line on the cutter coincides with the swivel axis of the attachment. This is done by first setting the point of the footstock center to coincide with the line of the attachment, and then adjusting the cutter to suit. By this method, when the cutter is once set, the attachment can be swiveled to any angle, and the correct relation of the center of the work and cutter is always maintained.

Universal Milling Attachment.

Fig. 2 shows a new universal milling attachment, so called, because the cutter spindle can be swiveled to any

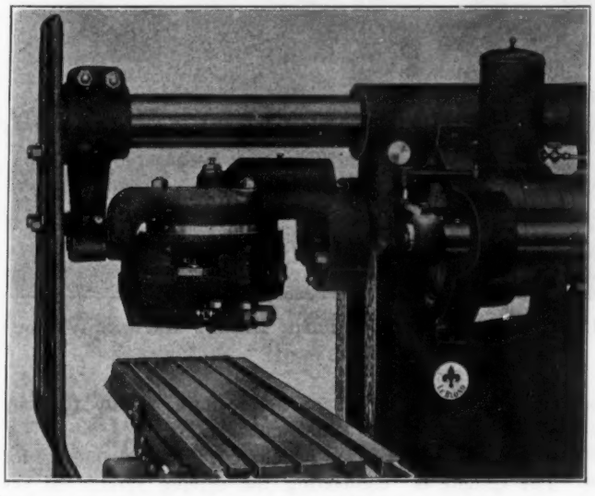


FIG. 1—UNIVERSAL SPIRAL GEAR CUTTING ATTACHMENT.

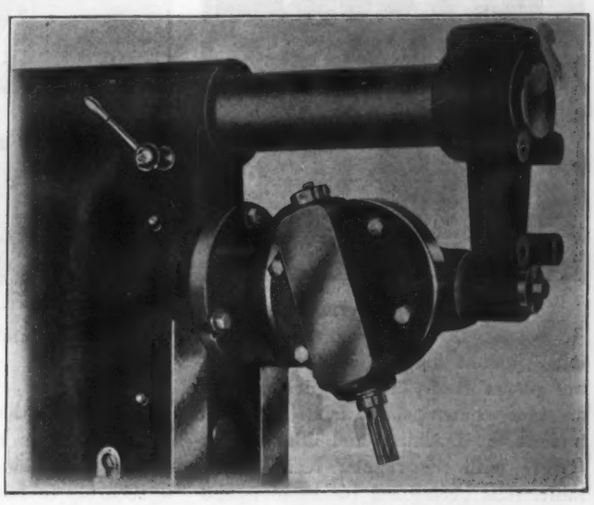


FIG. 2—UNIVERSAL MILLING ATTACHMENT.

position in a horizontal or vertical plane. It being fully universal, it is applicable to a large variety of work, such as drilling, milling, key-setting, milling angular slots, racks, etc. The attachment is bolted to the column of

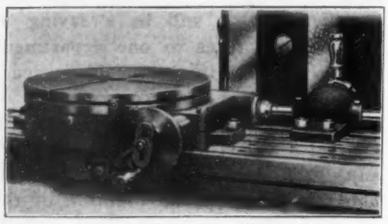


FIG. 3—CIRCULAR MILLING ATTACHMENT.

the machine, and the outer end is supported by the arm. The spindle is driven by a clutch on the spindle through two pairs of mitre gears. The front bearing is tapered, hardened and ground. The rear bearing is straight and is adjusted by drawing in a taper bush.

Circular Milling Attachment.

Fig. 3 illustrates a circular milling attachment of compact design. The height is condensed as much as possible to give the maximum distance for work when used in combination with the vertical attachment. The worm wheel has 120 teeth, and is driven by a worm made solid with the shaft. The worm is carried in an eccentric sleeve by which it can be thrown entirely out of gear, permitting the table to be turned by hand. The end thrust of the worm is taken against ball bear-

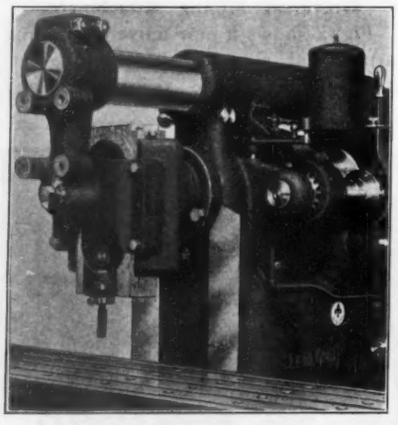


FIG. 4—SLOTTING ATTACHMENT.

ings. Means are provided for attaching power feed. This is driven from an independent shaft from the feed box of the machine, and does not interfere with the regular feeds to the table, thus permitting pieces of irregular shape of both straight and circular outline to be milled with automatic feed. The attachment can be operated in either direction, and has trip dogs which automatically trip the feed to a line at any point. The feed is reversed by bevel gears. The hand wheel can be removed and index plates or a sector substituted, which permits accurate dividing to be done; the same number of divisions obtain as on the standard dividing head. The table is bored taper to receive a plug for use in gear cutting.

Slotting Attachment.

Fig. 4 illustrates a new slotting attachment. This attachment can be swiveled in a vertical plane through 260 degrees, enabling slotting to be done at any angle from vertical to horizontal. The slotter head is driven from the clutch on the spindle nose of the machine and is adjustable to any length of stroke from zero to full capacity. The tool holder is graduated and can be swiveled in its bearing and clamped, enabling the cutting edge of the tool to be set in correct relation to the work without disturbing its adjustment.

Vertical Index Head.

The vertical index, Fig. 5, is found to be rapid and economical in cutting clutches, milling the heads of screws and similar work. The divisions are made by a vertical notched plate, which can be handled rapidly. After the division is made the small lever shown in the side of the spindle locks it securely in position. The spindle is tapering, the front flange being extended to protect the index plate from chips. The spindle has a No. 11 Brown & Sharpe taper hole. The whole attachment is rigid and will stand up to the most severe work.

Hobbing Attachment.

A hobbing attachment is illustrated

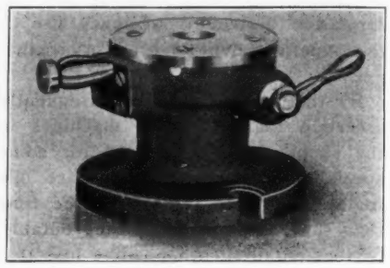


FIG. 5—VERTICAL INDEX.

in Fig. 6. For hobbing, by means of this attachment the following advantages are claimed: 1. A single hob will cut all numbers of teeth a given pitch. 2. The action of the hob passing through the work generates the tooth correctly. 3. A high output is obtained, because there is no time lost in returning the cutter and indexing the blank. 4. In cutting worm wheels the hobbing attachment is particularly efficient, as the preliminary operation of gashing each tooth is entirely dispensed with, resulting in gears being produced much more rapidly than by the older methods.

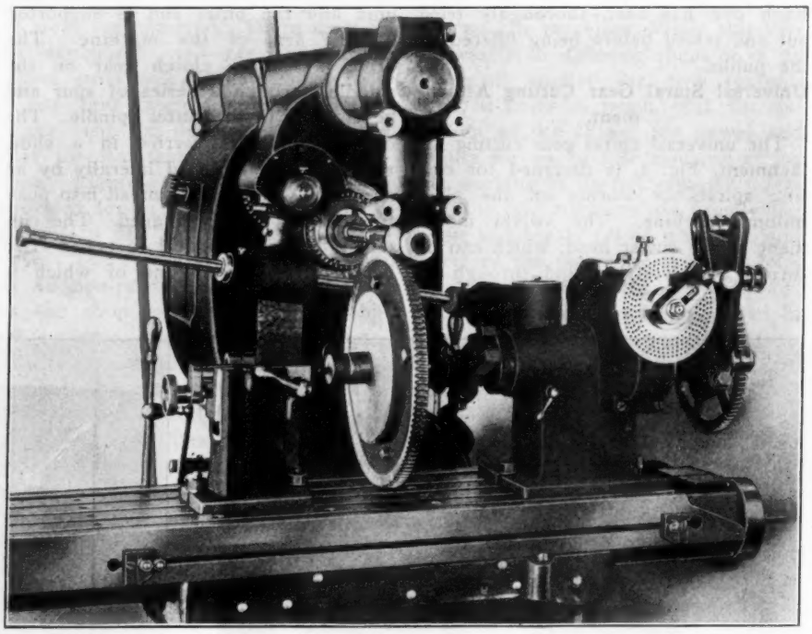


FIG. 6—HOBBING A LARGE WORM WHEEL ON A PLAIN MILLING MACHINE WITHOUT PREVIOUS NOTCHING.

The attachment provides means for connecting the driving spindle of the milling machine with the main spindle of the dividing head through flexi-

ble bevel gear joints and a shaft that gives positive motion to the dividing head spindle. Various ratios of speed between the two spindles for cutting various numbers of teeth are obtained by a quadrant and change gears. The attachment is bolted to a standard plain dividing head and is driven by a gear screwed to the spindle nose. The splined shaft on the attachment is connected at either end by two pairs of miter gears supported in swivel bearings. This combination makes a universal joint, which, unlike a knuckle joint, transmits motion evenly and positively in any position. The quadrant and change gears are carried at the end of the attachment, and are so arranged that the driving shaft can be connected either directly to the spindle for cutting low numbered divisions or through the worm and worm wheel for large numbers of teeth.

NEW 16-INCH WALCOTT ENGINE LATHE.

The Walcott & Wood Machine Tool Co., Jackson, Mich., is building a new plain manufacturing lathe of exceptional stiffness and cutting power. The machine is primarily designed for severe work with high speed steel tools. One of its principal features is the quick change feed device on the rear end of the spindle. This very simple device gives three changes of feed through sliding gears shown in detail in Fig. 2. By throwing the lever at the side of the bed near the end, three more changes of feed can be obtained, making six in all. The gear box on the end of the head is used also in connection with thread cutting, so that for getting the different pitches only one-half the number of gears need to be changed, as formerly. The index plate corresponds with numbers 1, 2 and 3 on the gear box for the various pitches.

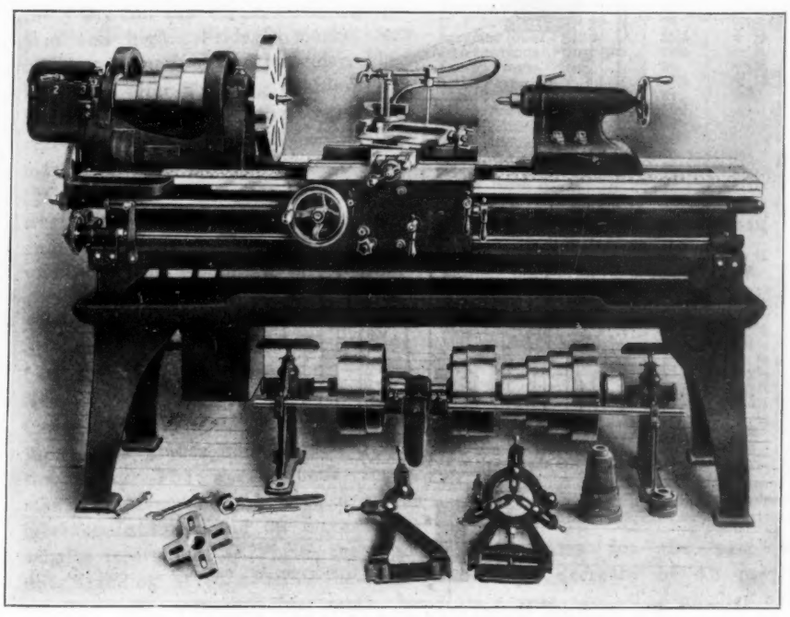


FIG. 1—WALCOTT 16-INCH LATHE.

One of the important features of the lathe is the apron. No friction is used and the drive is positive. Both the longitudinal and cross feeds in either direction can be operated from the apron. The two feeds cannot be thrown in together. Also the binding arrangement and device for throwing in the lead screw nut for thread cutting are both on the front of the apron within easy reach of the operator. In thread cutting, one turn of the hand wheel moves the carriage approximately 1 inch, so that the carriage can be moved back by hand and by keeping count of the number of whole turns on the hand wheel, the lead screw nut can be thrown in and be sure to match into the right place. The lathe is solidly built and is equipped with the usual accessories, including drip pan and oil pump.

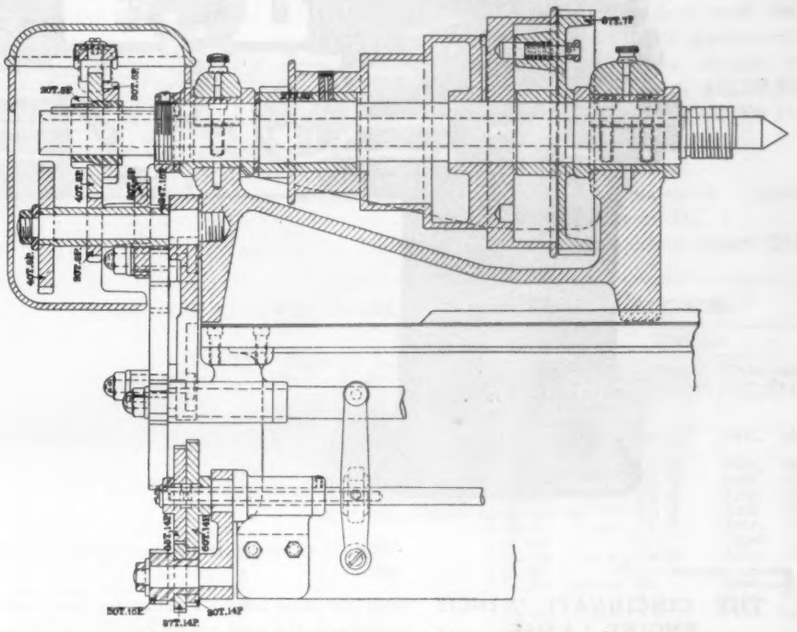


FIG. 2—HEADSTOCK DETAILS, 16-INCH WALCOTT LATHE.

The principal dimensions of the machine are as follows:

Swing over all...	16⅜ inches.
Length of bed...	6, 8 or 10 feet.
Front spindle bearing	2½ inches diameter.
Back gear ratio..	10:1
Width of belt...	2½ inches.
Cuts, threads....	3 to 36 per inch.

John J. Greenough, noted throughout the east as an inventor, died Aug. 26 at Boston. He was born in Boston Jan. 19, 1812, and was the first American to receive a patent on a sewing machine. He was the inventor of the shoe pegging machine, and assisted in the mechanical construction of the first locomotive engine run by electricity, and operated it from Washington. He was superintendent of the government patent office from 1837 to 1841.

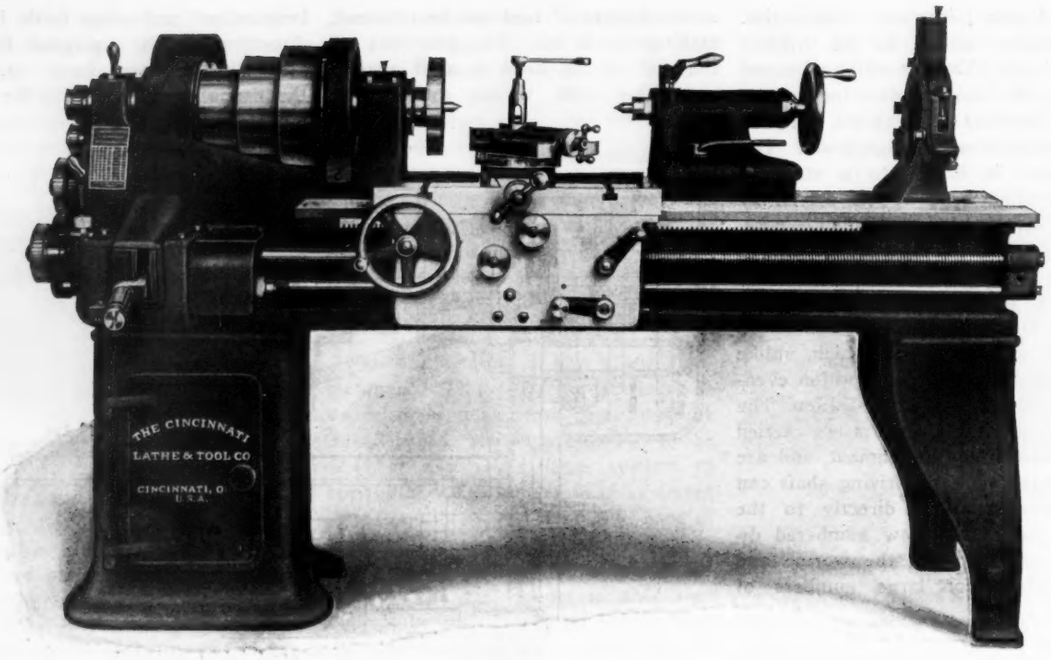


FIG. 1—CINCINNATI 16-INCH ENGINE LATHE.

THE CINCINNATI 16-INCH ENGINE LATHE.

An advance in the construction of engine lathes is found in the new 16-inch machine recently placed on the market by the Cincinnati Lathe & Tool Co., Cincinnati. The most prominent feature of this lathe is the positive geared feed device.

The positive-geared feed has many advantages over the old style belt feed. Lathes fitted with it are particularly adapted for the use of any high speed tool steel. The geared device on this lathe provides six feeds ranging from 16 to 100 per inch, which are obtained by moving the feed lever. These feeds are independent, and, therefore, may be secured without operating the lead screw continuously.

Referring to the accompanying drawing, the device consists of the shaft M, to which is keyed the bevel gear A, driving the pinion B, the shaft R and the worm C. These are supported by the bracket G swinging on the shaft M, allowing G to move up and down. When the gear I or H is meshed with the gear J or K on the feed rod, it gives instantly the six changes, which are generally sufficient on a 16-inch lathe for general manufacturing. Twenty-two additional feed changes, ranging from 5 to 64 per inch, are secured by sliding the gear W on the lead screw in mesh with the gear J on the feed rod. The lead screw is 4 pitch and cuts threads from 2 to 24 per inch, including 11½. An unlimited range of feeds may be secured by means of extra change gears for screw cutting. The safety stop U prevents both the feed rod and lead screw from becoming engaged at the same time. Placing the pin P into holes in the gear casing retains the worm C in mesh with the worm gears D, E and F. The fork T is used to shift the worm wheels into mesh with the worm C.

The carriage is gibbed both front and back and is rigid, with bearings the entire length of the V's on the bed. The longitudinal and cross friction feeds in the apron can be started, stopped or reversed while the lathe is running, but cannot be engaged for cutting screws.

The following table gives the principal dimensions of the machine:

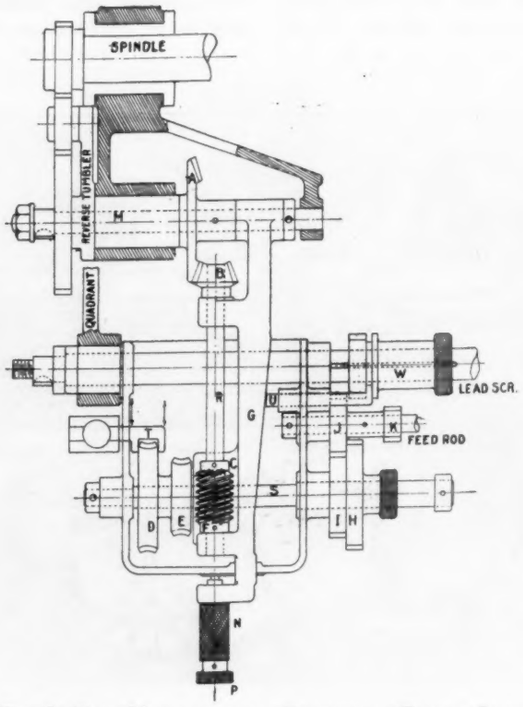


FIG. 2—FEED MECHANISM OF CINCINNATI ENGINE LATHE.

Swing over bed	16½ inches
Swing over carriage	10¼ inches
Width of belt, 5-step cone	2½ inches
Width of belt, 3-step cone	3¼ inches
Lengths of bed	6, 8, 10 and 12 feet
Length of carriage bearing on bed	22 inches
Hole in spindle	1¼ inches
Distance between centers, 6-foot bed	34 inches
Weight (net) 6-foot lathe	2,000 pounds

Rapid Recovery From Severe Scare.

The New York market closed Saturday in a strong position on pool support in standard dividend railroad and industrial stocks. Strength followed upon speculative hesitancy in the fore part of the week, which was the natural result of the sensational plunge of the Saturday preceding, which ended in the failure on Tuesday of a Wall Street bear house. This failure led to a scare that other houses might be involved, but the fear was dispelled in a day or so. However, it is conceded that the public was out of the market.

Monday's opening was dull and heavy. Stock exchange authorities named a committee to investigate the manipulation of Saturday's market, when over 1,100,000 shares changed hands in two hours. When the failure on Tuesday was announced, the market sold off and closed heavy. Wednesday witnessed one of the dullest days for months, sales reaching not quite 300,000 shares. Prices were steady, however, and one railroad stock advanced to the highest ever quoted. On Thursday came a complete revulsion of sentiment and trading was active, another Harriman stock reaching the highest price of the year, and the whole market closed firm and high. Friday's market was moderately active, but irregular, closing weak after a strong opening. The highest average of the year was reached by prices on Saturday, the market closing strong.

Call loans were easy during the week, ranging from ¾ to 1 per cent, and time loans declined toward the middle of the week, sterling exchange also being lower. Later in the week foreign exchange advanced and again declined to near the gold importing level. Gold to the amount of $2,600,000 was shipped from New York to Canada. Copper metal prices advanced ⅛c in all grades the latter part of the week. The weekly bank statement was favorable, showing a small increase in loans and an increase in surplus reserves of $2,211,000, the total now standing at $67,670,850, the largest for any corresponding week in 14 years. The statement of actual conditions of clearing house banks showed loans increased $8,968,900; deposits increased $7,414,400; and the percentage of actual reserve 29.61, a decrease of 0.027. Non-member banks and trust companies showed loans increased $3,479,100; new deposits increased $7,296,600, and the percentage of reserve, 35.8, a decrease of 0.03. Bonds showed marked activity, the successful placing of $17,000,000 Atchison 4 per cent 50-year gold bonds comparing with only short-term note sales of a year ago. Foreign bank statements were favorable. London felt a small "boom" in South African stocks, its first really cheerful sign.

Clearing house exchanges in the United States for the past week showed a decrease of 4.8 per cent from a year ago. The number of idle freight cars in this country and Canada on Aug. 19 was 28,618 less than shown on Aug. 5. Commercial failures in the United States were 252, compared with 239 the preceding week, and 203 the corresponding week last year. Shares were dealt in to the number of 3,537,964, compared with 4,629.990 the preceding week, and 2,158,000 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $28,357,000, compared with $12,238,000 the preceding week, and $5,697,000 the corresponding week last year.

Copper Stocks.

New York.—Amalgamated Copper closed 81, a net gain of 2⅝.

Boston.—Butte Coalition closed 27⅛, a net gain of ½; Calumet & Arizona closed 123, a net gain of 5; Calumet & Hecla closed 675, no change; North Butte Mining closed 88¼, a net gain of 5⅜; Quincy Mining closed 96, a net gain of 2.

Financial Notes.

The General Electric Co. declared the regular quarterly dividend of $2 per share, payable Oct. 15.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Aug. 29	Changes in Week	Date 1908 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	11⅜	.....	Sept. 3	19.820 000			
Allis-Chalmers pr	35¾	+1¼		16 150.000	7 cum	1¾ Q.	Feb., 1904
American Can	6	.....	Feb. 3	41 233 300			
Am. Can pr	61⅜	+ ⅜		41.233.300	7 cum	1¾ Q.	July, 1908
Am. Car & Foundry	41¼	+1⅜	June 25	30.000.000		¼ Q.	July, 1908
Am. Car & Fdy. pr	103½	+ ½		30 000.000	7 n. c.	1¾ Q.	July, 1908
American Loc.	57¼	+1⅜	Oct. 20	25.000.000	5	1¼ Q.	Aug., 1908
American Loc. pr	106	−1		25 000.000	7 cum	1¾ Q.	July, 1908
American Ship	48¾	− ⅛	Oct. 14	7 60 000	4	1 Q.	June, 1908
American Ship pr	100⅛	.....		7.900.000	7 n. c.	1¾ Q.	July, 1908
Am. Steel Foundries ctfs	8	−1	Oct. 6	15 810 000			
Am. Steel Foundries (new	33	−3		17,240,000	6 cum	2½	Aug., 1904
Barney & Smith	45	.....	June 2	2.000,000	4	1 Q.	Sept., 1907
Barney & Smith pr	102	.....		2 500 000	8 cum	2 Q.	June, 1908
Bethlehem Steel	23	+1½	April 7	14,862.000			
Bethlehem Steel pr	51	− ⅝		14 968 000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	57¼	+2¾	March 17	45.000 000*	6	1½ S. A.	Aug., 1908
Cambria Iron	46	.....		8,468.000*	4	2 S. A.	April, 1908
Chicago Pneumatic Tool	25½	− ¾	Feb. 17	6,145.800	4	1 Q.	Oct., 1907
Colorado Fuel	36⅛	+3½	Oct. 19	34 235 500		3½	April, 1902
Crucible Steel	7⅛	− ⅛	Oct. 21	24.578 400			
Crucible Steel pr	50¼	+2¾		24,436.500	7 cum	1 Q.	Dec., 1907
Empire Steel	7	.....	Feb. 26	1,254.770			
Empire Steel pr	48	.....		2 500,000	6 cum	3 S. A.	July, 1908
Fay & Egan	100	.....	Feb. 18	1,000.000	6	1½ Q.	Aug., 1908
Fay & Egan pr	110	.....		1,000 000	7 cum	1¾ Q.	Aug., 1908
General Electric	146	+2½	May 12	65,167.400	8	2 Q.	July, 1908
Harbison-Walker	12	.....	Jan. 20	18,000 000		½	Oct., 1907
Harbison-Walker pr	75	.....		9.6 0.000	6 cum	1½ Q.	July, 1908
International Pump	25½	+ ⅜	June 2	17.787 300		1	April, 1905
International Pump pr	79¾	− ¼		13,835.000	6 cum	1½ Q.	Aug., 1908
Lackawanna Steel	34	−1½	March 11	34.971 400			
Lake Sup. Corp	6⅛	+ ⅛	Oct. 7	40.000.000			
New York Air Brake	81	+7	June 18	8 012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	130	.....	Feb. 5	8.000 000	6	1½ Q.	Sept., 1908
Niles-Bement-Pond pr	100	.....		2.000,000	6 cum	1½ Q.	Aug., 1908
Otis Elevator Co.	38	.....	March 16	6 156.600		1½ S. A.	April, 1908
Otis Elevator Co. pr	90	−1		5 449.500	6 n. c.	1½ Q.	July, 1908
Penn. Steel	60	.....	May 11	10.770 000			
Penn. Steel pr	98	.....		16.500 400	7 n. c.	3½ S. A.	May, 1908
Pittsburg Coal Co.	11¼	.....	Feb. 10	28,853 400			Nov., 1906
Pittsburg Coal Co. pr	43	.....		27,080.800	7 c.	1¾	April, 1905
Pressed Steel Car	35	+1¼	Feb. 19	12,500,000		3	Aug., 1904
Pressed Steel Car pr	96	.....		12.500.000	7 n. c.	1¾ Q.	Aug., 1908
Pullman	165	− ½	Nov. 11	100 000 000	8	2 Q.	Aug., 1908
Railway Stl. Spring	45	+3	March 5	13,500.000	4	2 S. A.	April, 1908
Railway Stl Spring pr	100	.....		13,500 000	7 cum	1¾ Q.	Sept., 1908
Rep. Iron & Steel	24¼	+1½	Oct. 21	27.191.000			
Rep Iron & Steel pr	80	+2		20,416 900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	63¾	+3¼	March 11	10.000.000	5	1 Q	Sept., 1908
Sloss-Sheffield pr	102½	+1½		6.700 000	7 n. c.	1¾ Q.	July, 1908
U. S. Pipe & Fdy.	26¾	+ ⅝	June 24	12.500.000	4	1 Q.	Dec., 1907
U. S. Pipe & Fdy pr	73½	−2¼		12 500,000	7 n. c	1¾ Q.	Sept., 1908
U. S. Steel	47½	+1¾	April 20	508,302,500	2 n. c.	¼ Q.	Sept., 1908
U. S. Steel pr	111⅞	+3¾		360,281.100	7 cum	1¾ Q.	Aug., 1908
U. S Steel 5'	100¼	+ ¼		463,798.000	5	5 A.	.....
Va. Iron, Coal & Coke	61	+2	Nov. 17	9.073 680			
Westinghouse Elec.	75	+3	June 24	28 933 200	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	109	.....	Oct. 6	11.000.000*		2½ Q.	July, 1908

Par value of shares, $100, except those starred (*), $50

NEWS FROM MANY INDUSTRIES

New Buyers:—

The Kenton Foundry Co., Cincinnati, has been chartered by Fred Breiner, Frank Eltrup and Fred Bosken. The company is capitalized at $10,000.

The Diamond Steel Pole Co., Philadelphia, founder, machinist, engineer, etc., was recently incorporated by James W. Rawle, Wilfred L. Wright and J. L. Roultney.

The Morris Ford Engine & Thresher Co., Racine, Wis., capitalized at $400,000, has been chartered by Albert K. Stebbins, John A. Wallis and August C. Moeller.

Edward Brown, W. J. Moore and William Breese, Pittsburg, are the incorporators of the National Refined Iron & Horseshoe Co., Pittsburg, bar iron, horseshoes, etc.

The Canadian Fire Engine Co. Ltd., London, Ont., has filed articles of incorporation, with $40,000 capital stock, through David H. Gillies, Robert Angus, Arthur J. Cartwright and others.

The American Iron Roofing Co., Elyria, O., with a capital of $25.000, has been incorporated by C. H. Lewis, Louis Schmerer, Frank R. Fauver, Charles L. Schmerer and Julia Schmerer.

The Felcher Blacksmiths' Supply Co., Newark, N. J., manufacturing blacksmith, with $25,000 capital stock, has been incorporated by L. Felcher, Newark; D. Rowley, I. Felcher and L. Klugman, Newark.

The Boston Gas Producer & Engine Co., Cambridge, Mass., gas engines, has been incorporated with $100,000 capital stock. F. F. Stockwell, Somerville, Mass., is president and treasurer.

H. A. Ross, N. A. Ross and C. C. Morrison, Pittsburg, were granted a certificate of incorporation as the Henry A. Ross Co., to buy and sell iron and steel, coke and railroad supplies.

The Twentieth Century Iron & Steel Co. has been organized by Thomas R. Pullis, David W. Graham and Y. F. Massop, all of St. Louis, to deal in iron, copper, steel, wire, etc., with $75.000 capital stock.

The Chesapeake Gas Engine Corporation, Phoebus, Va., gas engines, has been incorporated with $50,000 capital stock, and will manufacture and repair gas engines, boats, etc. The charter members are: Richard Armstrong, president, Hampton, Va.; A. F. Bowen, secretary and treasurer, Newport News, Va. The company will erect a suitable building 32 x 80 feet.

The Hammond Machine & Forge Works, Hammond, Ind., has filed articles of incorporation with the secretary of state showing a capitalization of $15,000. The directors include C. H. Luthman, P. Moser Jr., and D. Bruhn.

The Germantown Foundry & Machine Co., Philadelphia, Pa., has been chartered by John J. Welsh, Thomas Why and Harry M. Elliott, Philadelphia. The company will operate a general foundry and machine shop.

The Central Wire & Iron Co., Cleveland, has been incorporated with capital stock of $10,000, and the incorporators are: Bert Clemens, F. R. Sheperd, Albert H. Vetter, Frank P. Atherton and L. J. Currie.

The Stocker Mfg. Co., St. Louis, has been granted a charter to equip and install pneumatic and steam power. The capital stock is $65,000, and the incorporators are: Joseph J. Stocker, Rosina A. Newman and Albert L. Schmidt.

The Western Packing & Supply Co., First National Bank building, Chicago, has filed articles of incorporation to manufacture and deal in machinery and supplies. The capital stock is $6,000, and the incorporators are: E. M. Mills, C. Freeburg and W. W. Hill.

The Pioneer Steel Corporation, Tacoma, Wash., has been incorporated with $10,000,000 capital stock through A. P. Gillies, George W. Driver, Robert Young, Tacoma; A. W. McClellan, Vancouver B. C.; W. D. Ascongh, E. C. McDougall, of Seattle, Wash.

The Electric Automatic Machine Co., Pittsburg, has been incorporated with $100,000 capital stock through R. R. McElhaney, Center avenue; H. K. Beegle, Black avenue; M. E. Johnson, Hotel Loraine, all of Pittsburg; and George D. McMorran, Bakerstown, Pa.

Central Garage & Machine Works, New York City, has been granted a charter to engage in the manufacture of engines and machines, cars, etc., with an authorized capital of $5,000. Those interested are Henry Haaker, Edwin A. Haaker, Henry W. Haaker, 238 West Fiftieth street, New York City.

The Lane-Laurier Packing Co., New York City, has been incorporated to manufacture and deal in packings and engineers' materials and supplies, with $20,000 capital stock. The incorporators include Fred Laurer, Upper Montclair, N. J.; J. Welling Lane, 130 Clark street, Jersey City; R. G. Davey, 63 West Fifty-sixth street, New York.

The Quick Heater Co., Indianapolis, has been organized and will establish a plant at Indianapolis for the manufacture of instantaneous water heaters and heater supplies. The company is capitalized at $25,000, with William E. Kurtz, John A. Kurtz and Harmon H. Fulton as directors.

A charter has been granted to the Scully Detachable Horseshoe Co., Rome, N. Y., to manufacture detachable horseshoes, with $100,000 capital stock. The incorporators are Thomas P. Scully, Rome, N. Y.; John A. Breen and James Coupe, Utica, and others.

The O. V. Ball Cutlery Co., Rahway, N. J., hardware, has been chartered by Fred Knowlton, 638 East 139th street; G. Q. Dean, 1628 Amsterdam avenue, both of New York; and M. V. Landeen, 301 Thirteenth street, Brooklyn, N. Y. The capital stock is $125,000.

With an authoried capital of $10,000, the New Haven Foundry, New Haven, Conn., has been incorporated to make sash weights and other metal castings. The incorporators include Henry M. Land and Jacob Gordon, of Norwich, Conn., and Louis J. Land, of New Haven, Conn.

A charter has been granted to the Spooner-Mathewson Co., New York City, foundry and machine shop, capitalized at $10,000. The incorporators are: Frederick Dwight, 52 William street; Ernest T. Mathewson, 73 Morningside avenue; H. W. Spooner Jr., 90 West street, all of New York City.

Articles of incorporation have been filed by the Price Boltless Rail Joint Co., New Orleans, La., to manufacture Price boltless joints for railway construction. The directors of the company are: John Price, of Crowley, La.; Edward Wunderlich, E. H. McFall, P. D. Parks and others, of New Orleans, La.

Mantle & Co., New York City, to manufacture machinery, engines, boilers, etc., have filed application for a charter. The company is capitalized at $10,000, and has these incorporators: Joseph G. C. Mantle, 1907 Park avenue; Herman L. Kollmar, 782 Home street; Charles H. Friedrich, 35 Nassau street, all of New York City.

New Construction:—

The Salina Foundry & Mfg. Co., Salina, Kans., has taken out a building permit for a two-story cement building, 52 x 112 feet.

Graders are preparing the ground for the proposed addition to the plant of the Pressed Steel Tank Co., Milwaukee, Wis.

The West Allis Malleable Iron & Chain Co., Milwaukee, Wis., is arranging to build an addition to the plant as well as erect a warehouse.

The Susquehanna Iron Co., York, Pa., is clearing up the site of the fatal boiler explosion, Aug. 10, and will rebuild the mill at once.

The Kansas City, Mexico & Orient Railway Co. is having plans prepared for a roundhouse and machine, blacksmith and erecting shops, to be built of brick, 153 x 334 feet, and a power house of brick, 85 x 90 feet, located at Wichita, Kans.

The Pacific Coast Condensed Milk Co., Kent, Wash., has commenced erecting a new building to be used as a machine and repair shop, 80 x 120 feet. A still larger building will be constructed shortly to be used for manufacturing cans for the company's product.

The Frisco Iron & Steel Co., Frisco, Pa. (P. O. Ellwood City), which was recently organized, has secured a site at Frisco, and is starting excavating for the foundation. The main building will be 140 x 250 feet. The company will manufacture tubing from scrap.

The Stanley Rule & Level Co., New Britain, Conn., has plans prepared for a brick factory building, three stories and basement, of heavy mill construction. The walls will be heavy enough to allow for building several additional stories when desired. It will be used mainly for storage purposes.

The Rosalia Mfg. Co., Rosalia, Wash., has completed the temporary building which will be used as a machine shop, and is installing machinery. Its chief output will be traction and stationary engines as well as gasoline motors. The foundry will be equipped for turning out both iron and brass castings.

The Globe Machinery & Supply Co., Des Moines, Ia., has begun preliminary work on a new foundry building near the present shops on Seventh street. The buildings occupied at present will be worked into the new construction, which will have a frontage of 184 and a depth of 132 feet. In addition to a jobbing and oiler supply business, the company has begun the manufacture of coal mine cars.

The Woonsocket Machine & Press Co., Woonsocket, R. I., is building an addition to its plant. It will be 200 feet long and cover 38,000 square feet of land. The concern at present employs about 700 hands.

The Western Steel Car & Foundry Co., Chicago, has let several contracts for a steel car shop and a large car erecting shop to be built as an addition to the company's plant at Burnham, Ill. They will be one-story, 200 x 240 and 150 x 300 feet, respectively, steel and corrugated iron construction, and will cost $150,000 each.

The construction of the Howatt manufacturing plant at Sharon, Pa., has been started. John B. Howatt, of Sterling, Ill., is at the head of the company, capitalized at $75,000, to manufacture barn door hangers and a special line of hardware. Two brick buildings and one frame building are being built, and will afford employment to 75 hands.

The Pittsburg Locomotive Co., Pittsburg, is making improvements to its machine shop, which will add considerably to the capacity of the plant. Most of the equipment has been overhauled, and additional heavy machinery has been installed. The shop has been rearranged in that both the heavier and lighter equipment have been grouped in single departments.

The Star Drilling Machine Co., Portland, Ore., is constructing a plant on Clinton street, covering nearly an entire block, at a cost of about $20,000. One building will be devoted to the wood working department, and a two story building will be set apart for the machine shop. The plant is a branch of the main manufacturing concern at Akron, O. It is planned that the shops will be completed within three months.

The Terry Steam Turbine Co., Hartford, Conn., has completed plans for a new factory, one-story, brick, 82 x 200 feet, with monitor roof. Two other Connecticut concerns are planning to build, the Steel & Johnson Mfg. Co., of Waterbury, makers of brass goods, a four-story brick addition, 42 x 150 feet, and the W. D. Forbes Co., New London, builders of engines and motors, a new plant.

General Industrial:—

The Salina Foundry & Mfg. Co., Salina, Kans., advises that its proposed new building will be two stories, 50 x 120 feet, and will be used as a repair shop as well as for the manufacture of self feeders. The company will act as the supply house for the wholesale thresher trade, as well as the manufacture of specialties, and will discontinue foundry work.

The Woodward Iron Co., Woodward, Ala., has ordered a locomotive from the Baldwin Locomotive Works.

The Metal Stamping & Mfg. Co., Milwaukee, has changed its directorate from three to five members.

The Columbia Wire & Iron Works, Portland, Ore., advises that the damage to its plant recently noted was very slight, not enough to need rebuilding.

The Prier Brass Mfg. Co., Kansas City, Kans., brass, bronze, copper and aluminum castings, advises that it is now moving its plant to new quarters, and will not be in the market for new equipment.

Frank McKay has been appointed by the referee in bankruptcy receiver for the H. C. H. Walsh Co., Chicago, manufacturer of machinery. The liabilities are estimated at $25,000, and the assets at $15,000.

The Western Fence Co., for Peck, Anderson & Peck, has leased the entire third story of the building at the northwest corner of Court and Broadway, Cincinnati, for a period of three years and eight months.

The New Foundry Co., Cincinnati, has filed a deed of assignment, the assets being estimated at $5,000 and liabilities at $8,000. The assignment followed the suicide of Henry Herrle, who was treasurer of the concern.

W. C. Trout, of the Lufkin Foundry & Machine Co., Lufkin, Tex., has been awarded the contract for rebuilding the lumber plant of Thompson & Tucker, at Doucette, Tex. The contract price for building and machinery was $80,000.

The plant at New Orleans of the Schwartz Foundry Co. has been purchased by the New Orleans Iron & Foundry Co., which was recently incorporated with a capital stock of $200,000. Gustave Lemle is interested in the management of the new company.

John E. Jones, of Louisville, Ky., is negotiating with a business men's organization of Salt Lake City, Utah, for the removal of a rolling mill from Louisville, Ky., to Salt Lake City. The undertaking will involve the organization of a stock company, with a capital of $300,000.

The Central City Stove Co., Newark, O., is moving to Anderson, Ind., where it will be known as the Central Stove & Foundry Co. President

David C. Brown, of the Central company, has purchased the factory buildings of Thomas C. Fisher, comprising two acres, for $6,500. The Central company will receive $7,500 from the factory lot committee, in consideration of moving its plant to Anderson.

An order has been granted by the court for winding up the Northern Iron Works, Winnipeg, Can., which was incorporated in October, 1907, to take over the business of R. A. McCready with a capital of $75,000. The company closed down Jan. 25 last, owing to the depression and the inability to procure working capital. The order was granted on the application of R. A. McCready, who is president, and J. G. Hargrave & Co., extensive creditors.

The plant, equipment and stock of the Canadian Stove Co., Ottawa, Ont., was recently sold to Delahaye Bros., of Pembroke, Ont., for $49,000. The business was started two years ago, and was then known as the Ottawa Furnace & Foundry Co., passing over to the Canada Stove Co., which a few months ago made an assignment.

The headquarters of the J. L. Smith Furnace Co., Milwaukee, have been removed to West Allis, one of the suburbs of the city. Officers elected at the recent annual election of the company are: President, J. L. White; vice president, Albert Speich; treasurer, Jesse Bradley, and George C. Hinkley, secretary and manager. The company has taken up a large contract with the Ideal Laundry Co. of Milwaukee, which is erecting a new plant in the city.

The Hammack Steel Range Co., Knoxville, Tenn., at its first annual meeting recently, elected the following directors: E. J. Wooten, T. J. Hinken, Ernest Procter, James C. Carson, M. E. Parmalee, Frank J. Jones and R. H. Lanson. The directors chose these officers: President, E. J. Wooten; vice president, T. J. Hinken; secretary and treasurer, Frank J. Jones. Mr. Wooten will be general manager, N. D. Hammack having retired from the company. It is the intention of the company to start its plant in South Knoxville by the middle of September and to begin manufacturing with an output at commencement of 15 ranges per day.

The Houston Car Wheel & Machine Co. is the successor of the Waterman Car Wheel & Foundry Co., and is also operating the Houston Engineering & Machine Co. in conjunction with a former plant. The company has a well equipped up-to-date foundry and machine shop and while it expects to make a specialty of the engineering department, it contemplates taking care of anything in the way of foundry and machine shop work.

The Dyett Machine Co., New York City, advises that the company has been organized to take over and handle the rights in the United States for the Dyett automatic sand-lime brick machine. It is a close corporation, all of the stock being held by James H. Dyett and a few other associates. Mr. Dyett is president, and Charles C. Kimball, secretary. They will manufacture presses, and organize sub-companies in each state to take the state rights and manufacture brick on the Dyett machine. Concerning the machine, it is claimed that its capacity is five times greater than any other sand-lime brick making machine, and will produce a dense, smooth, finely finished sand-lime brick. The machine can be adjusted to produce an endless variety of ornamental bricks.

The J. G. Barr Electric & Heating Co., 248 East Randolph street, Chicago, advises that the company has been incorporated for the purpose of doing a general electric heating and contracting business, and also for manufacturing the combination motor equipment especially adapted to job printing presses. Each motor is built for alternating or direct current.

Robert Wetherill & Co., Chester, Pa., engine builders, are completing the erection of an engine of the Corliss type, 1,800 horsepower, at the central power plant of the Ohio Valley Electric Railway Co., at Kenova, W. Va. The railway company operates lines connecting the cities of Huntington, W. Va., Ashland and Catlettsburg, Ky., and Ironton, O.

Fires:—

The plant of the Crane Co. of Chicago, located at Los Angeles, Cal., was badly damaged Aug. 22, the loss being placed at $30,000.

The machine shop of Edward Moore & Son, Kittaning, Pa., was damaged Aug. 22, the loss being placed at $5,000, with insurance of $3,000.

Fire starting in the paint room damaged the plant of the Lovejoy Plow Co., Cambridge, N. Y., Aug. 20, the loss being placed at $15,000.

The plant of the A. J. Lindeman & Hoverson Co., Milwaukee, manufacturer of stoves, furnaces and general heating apparatus, was seriously damaged Aug. 26, the loss being placed at about $100,000, fully covered by insurance.

The foundry of the Kidder Press Co., Dover, N. H., was damaged to the extent of $2,000, Aug. 21, the loss being covered by insurance.

Trade Notes:—

Pilling & Crane, iron, ores, coal and coke, long located in the Girard Trust building, Philadelphia, have been located since Sept. 1 in suite 1405-12 Real Estate Trust building, at the corner of Broad and Chestnut streets, where increased facilities for the transaction of business by the firm are afforded.

The Champion Rivet Co., Cleveland, has appointed Alexander S. Mitchell, 45 Broadway, New York City, to represent the company in New York City and surrounding territory for the sale of the Victor boiler, ship and structural rivets.

TRADE PUBLICATIONS.

CONDENSERS.—Schutte & Koerting Co., Philadelphia, Pa., in catalog 5, section A, describes the Koerting Eductor Condensers. These require a head of 20 feet of water and work under all conditions of load variation. The air and non-condensable gases are discharged with the water, without the assistance of air pumps. The catalog discusses the low cost of working, the methods of application, and presents tables of prices and dimensions, and also describes the Koerting induction condensers, giving sizes, prices and facts concerning them. Rules are given for determining the size of condenser required, together with tables of the specific volume of steam at various pressures and quantities of condensing water required per minute per 100 feet piston speed.

BORING MILL.—The Gisholt Machine Co., Madison, Wis., has issued a sheet for its set of bulletins, describing the Gisholt 42-inch vertical boring mill.

MINE LOCOMOTIVES.—Electric mining locomotives are described in bulletins 301 and 501, issued by the Goodman Mfg. Co., Chicago. The bulletins are 10 x 7 inches, 51 and 31 pages, respectively, and illustrate a large number of different types of electric mine locomotives for various services.

STEEL MINE TIMBERS.—The Carnegie Steel Co., Pittsburg, has issued a 29-page catalog 10 x 8 inches, describing steel mine timbers, and discussing their advantages.

TRANSFORMERS.—The General Electric Co., Schenectady, N. Y., in bulletin No. 4608 describes the improved type H subway transformer for use in connection with underground installations. These transformers are watertight and are properly proportioned for the limited space available in man-holes. They possess high efficiency and large radiating surfaces, and their temperature rise is small.

SWITCHBOARDS.—Bulletin 4610 issued by the General Electric Co., Schenectady, describes a line of small plant continuous current switchboards. Each panel forms a separate and complete switchboard, and is not intended for combination with other panels. They are made to control one generator and two feeder circuits.